The Builder.

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ILLUSTRATIONS.

Design for a Large Town Mansion : Perspective View of Front.—By Mr. A. H. Hart, A.R.I.B.A. ..... *Double-Page Ink-Photo.*
Section and Plan of Mr. Hart's Design for a Large Town Mansion ..... *Two Single-Page Photo-Litho's.*
House "Munstead Corner," Godalming.—Mr. E. L. Lutyens, Architect ..... *Single-Page Ink-Photo.*
Design for a Proposed Church . East Elevation.—By Mr. J. E. Newberry, A.R.I.B.A. ..... *Single-Page Ink-Photo.*
Wayside Notes in East Anglia : Sketches in Norwich, North Walsham, and Costessey.—By Mr. J. S. Corder ..... *Double-Page Photo-Litho.*

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The Human Habitation.

ALL who visited the Paris Exhibition of 1889 will remember the series of erections illustrating the history of the Habitation which were ranged along the Quai d'Orsay, and of which we gave at the time a description illustrated by sketches. The collection of models of dwellings, though it could hardly pass for a serious illustration of the vast subject of human habitations, was a remarkable *tour de force* in the way of archæological illustration, considering that it was got up against time, at short notice, and as a mere pendant to the main body of the Exhibition. M. Chas. Garnier, under whose direction the work was carried out, has not been content with this extemporised scenic illustration, but has since then been occupied, in conjunction with M. A. Ammann, in carrying out the illustration of the subject in a more full and deliberate manner. The result is before the world in a ponderous quarto of nearly 900 pages,* produced by a joint effort which is compared in the lively and piquant preface (in which it is not difficult to trace the hand of M. Garnier) to the old fable of the blind man and the paralytic: "One of the authors is a historian who does not see very clearly into matters of architecture; the other is an architect who hobbles very much in the pathways of history." Mutually assisting each other, they have been able to make a very long journey, "puisqu'il dure depuis plus de dix mille ans!"

The object of the book is rather to popularise the subject than to settle any disputed points in archæology; in fact, it may readily be supposed that a book on so vast a subject produced in three years' time could hardly lay claim to occupying a position of exact criticism, since from that point of view the subject is too large for the lifetime of any one man. Contested points in regard to a subject of this kind can only be settled by those who devote themselves specially to one chapter of the history and follow it out in all its details. What the authors claim to have done, we may gather from the wording of their preface, is to have brought together and arranged in a systematic manner the best and most reliable information available from a collective treatment of their own researches and those of others who have treated special branches of architectural history.

The book is divided into five main heads, the first including the Pre-Historic period, the four others the Historic period, divided under the following sections—(1) Habitations prior to the Aryan invasions; (2) The Aryans and civilisations arising out of the Aryan invasions; (3) The great invasions and their consequences;* habitations of the Middle Ages and of modern times; (4) Habitations of people who have remained apart from the general movement of humanity. This latter heading includes the Chinese, the Japanese, the Cambodians, early American dwellings, &c., and makes (whether intentionally or not) a kind of connexion with or return to the opening subject, for it is in a considerable degree from the existing habitations of uncivilised tribes, where a kind of hereditary instinct rules, that we are able to conjecture the probable forms of pre-historic uncivilised habitations. It is in tacit recognition of this fact, we presume, that we find in connexion with the first chapter in the Pre-Historic section a view of the existing habitations of the tribe of Bongos, in the upper valley of the Nile: tent-like circular huts with thatched roofs and low walls of staves and wattles below.

The subject of pre-historic dwellings is fascinating enough in a speculative sense, and of course cannot be passed over in a general review of the history of the habitation, but it is an unsatisfactory element in a historical treatise, simply because it must for the most part be mere speculation. As in most cases, it leads the authors to those vague and general terms which we find in all such histories. Taking the habitations of the aboriginal Australian natives as known at the present day, and conveniently assuming Australia as "peut-être le plus ancienne terre de notre globe," it is "natural to admit" that this strange continent has maintained to our day the most ancient "documents" of the history of the race, and then "d'après ces données, nous pouvons aisément figurer quelle était l'existence des hommes vivant aux époques le plus reculées que vous puissions atteindre avec certitude." So we can in a general way; they were probably nomads, ignorant of the culture of the earth, chased by the large animals of those days, and having little to distinguish them from those animals except a certain faculty of arranging an artificial shelter from the weather where a natural one was not available, and of making some very rude cutting implements. All that can be imagined in a vague manner, with more or less realism according to the picturing power of each reader's mind. But it does not aid very much in tracing the history of the habitation. The authors, we observe, adopt the view that the formation of some kind of screen preceded the habitation in caves, and remark on it as a very important step in advance when men exchanged a temporary constructed shelter for a cave. We do not see why caves should be regarded as chronologically separate from the constructed shelter or *abri*. The use of caves for habitations would depend mainly on whether there were accessible caves in the locality; and in any case their use can hardly be considered a step in advance of the constructed shelter. Men living in natural caves have, so far, made no more progress in regard to a habitation than animals. The scooping-out of caves artificially is another matter, but the authors refer in the first instance to those "toutes préparées par la nature." A more important distinction between early classes of habitations is between those which were merely shelters from the elements, and those which were intended as defensible against human enemies. Between the shelter and the fortress is an immense step, and we should be disposed to say that it was the fear of other men, the tendency to fight and pillage, and therefore to form places of retreat and security, which was the more important factor in the development of the early habitations of mankind.

* "L'Habitation Humaine": par Chas. Garnier, Membre de l'Institut, Architecte du Nouvel Opéra; et A. Ammann, Agrégé de l'Université, Professeur au Lycée Louis-le-Grand. Ouvrage illustrée de 335 vignettes, et contenant 21 cartes. Paris: Librairie Hachette et Cie

* This appears to refer to the historic invasions from the north to the south of Europe since the Christian era.

This desire for security against attack was of course the influence which developed the elaborate system of lake dwellings, our knowledge of which is only a matter of comparatively recent acquirement, and was at first even received with scepticism by those outside the world of archæologists. This dream of security, say the authors, had long haunted the brain of Troglodyte man, who probably first thought of some means of fortifying the entry of his cave, even as Robinson Crusoe did so elaborately in his island. Indeed, the whole description of the fortified cave in that wonderfully realistic narrative is a striking exemplification of the kind of work to which early mankind might have betaken themselves in the endeavour to get security from attack or at least from surprise; only the civilised brain of Crusoe (or Defoe) was equal to a systematic plan of fortification beyond what we may suppose the ingenuity of primitive man to have been equal to. Of such cave fortifications we have, however, no positive evidence, however probable the attempt may seem. If it was attempted, there seems to have come a time when it was recognised that it was a failure, or at all events that dwellings built out over the water were much easier to defend. For it is a primary object of all kinds of fortification to reduce as much as possible the length of barrier to be defended. Now in the case of a cave the fortification was almost necessarily a somewhat extended one, if it were to defend the approach to the cave; in a lake-built village the access to be defended could be reduced to a single narrow gangway, capable of being entirely cut off at pleasure. Our authors, as in the former chapter, give an illustration of the same kind of device from modern life. Living on trees seems an even more out-of-the-way and difficult kind of arrangement than living on lakes, yet villages in the Soudan, according to Dr. Nachtigall, are in the present day built in the boughs of trees, and the authors give, from his description, a sufficiently dramatic representation of an attack on a tree-village. The existence of such a method of building in the present day renders it probable that a similar resource occurred to peoples in the same stage of civilisation in early times: according to Henri Mürger, indeed, it is a natural resource of distressed persons in all stages of civilisation, and a needy literary man in the "Vie de Bohéme" gives his address as "Boulevard So-and-So, third tree, fifth branch." The building of lake houses, however, was a step a good deal in advance of either cave-dwelling or tree-dwelling; the fixing of the supports for the platforms in the bed of the lake was a comparatively advanced piece of engineering, and the making of the platforms and houses thereon a piece of construction requiring care and skill. On the other hand we may presume that the development of the lake dwelling preceded the development of the boat, otherwise the security sought for would have been very largely discounted. Nowadays such lake villages as exist are found, as the authors show in illustrations, along with the use of canoes or other kind of boats; but it seems more probable that the earliest form of lake village was in a pre-boating period, and consisted of a peninsula of dwellings accessible by a narrow bridge, a portion of which was removable.

If we come to think of it, water has in later ages been a very important element in the defences of dwellings or fortifications. We have the moated châteaus of France as examples—practically lake dwellings of a more elaborate description; the moat for many centuries formed an indispensable girdle to castles and strongholds in various countries. And our own country is an example, in her past history, of the strength and security given by an insular situation, which is only the same thing on a larger scale.

When we first come within the Historic period we are still to a great extent in the Pre-Historic position in regard to the every-day habitation. The great buildings erected at the service of either religion or war, the temple and the tomb on the one hand and the fortress on the other, were monumental in character, and have endured so far as to leave us their main architectural elements complete, or open to intelligent study. But the every-day house was a more fragile and temporary structure, and has disappeared. Thus, in the book before us, the Egyptian habitation, the first on the list in what are called Historic times, is only decipherable from the data furnished by a few occasional conventional plans and representations, which leave us very far from arriving at a realistic conception of it. We know much more of the appearance and the social customs of the Egyptians themselves, from their pictured representations, than of the arrangement of the houses they inhabited. The authors go into a long description of the Egyptian house, but the only documents of any importance which they offer us are a "Plan of an Egyptian house" from a "peinture provenant d'un tombeau," and what they call a "maison égyptienne (d'après Champollion)," the latter a conventional kind of section with no unity of scale, and in which the figures alone convey the impression of being correct representations of fact; the house is capable of a very liberal interpretation. French writers are so fond of a complete theory that they are not easily deterred by a scarcity of data for it, and we can only regard the long description of the Egyptian house as an interesting but more or less imaginative document. It is characteristic of French archæological work of this class that no decisive information is given, in regard to the cuts, as to the precise place from which they are taken, or the presumable date of the representations. They furnish excuse for and illustration to a theory and a good deal of picturesque writing, but leave the less imaginative English reader unconvinced.

It is probable however that the authors are quite right in their dictum that the conditions of the climate as well as the social habits of the Egyptians led them to avoid confinement within the house as much as possible. The social habits in a great measure would arise out of the nature of the climate; they can hardly be considered entirely apart from it. There is however one point in regard to social philosophy, touched upon by the authors, which is entirely independent of climate. They remark on the fact that the position of women in Egypt was obviously that of a social equality with men; hence, they observe, we find "no *gynécée*, no harem, none of those domestic prisons in which Oriental civilisations have so often enclosed the women of the establishment." That this free position of women in ancient Egypt did exist is obvious enough from the Egyptian representation of social life, in which women are seen seated at entertainments and making calls much as they do in modern European society; though we doubt if this conclusion could have been arrived at from the dressing up of rather imaginary house plans out of the data furnished by the conventional representations on which these plans are professedly founded. All that can be said is that these representations of the arrangement of the house interior, so far as they are comprehensible, offer (as one might expect) no hint at variance with the social freedom of women as evidenced in the Egyptian representations of figures of contemporary life.

The social position of woman is however an extremely important factor in determining the arrangement of the house interior, either in a negative or positive sense, among all civilised peoples. The Oriental seclusion and comparative degradation of woman is an extreme instance. But in countries and times when woman took her place on a more or less social equality with man, there is even then the consideration, operating distinctly on the plan of the house, whether men and women were to live together habitually by daytime, or whether there was to be a separation of the sexes in their daily life, a "woman's quarter" separate from the rooms usually occupied by the men. This idea obtained, as we know, in Greece, where nevertheless women, even in the Homeric period, were in no condition analogous to that of Oriental harem life, though it could hardly be said that they enjoyed (or perhaps were fitted for) the modern position of intellectual and social equality of the sexes. The higher civilisation and culture advance, the more does this separation of the sexes disappear in family life and consequently in the family abode. In modern houses it may be said that the only survival of the old separation of the sexes in family life during waking hours is to be found in the existence of the smoking-room and the boudoir. And the provision for these, though they may be carefully arranged for a certain degree of seclusion, can hardly be said to affect the general character of the plan of the house; they can be worked into almost any type of plan. In fact, we have almost ceased to have a recognisable type of house-planning in modern Europe, unless we regard as one type that superposition of dwellings in the same block which is called "houses in flats." That is perhaps the most distinctively modern European type that can be named.

Viewing the subject at large, we may say that the most important influences in determining the type and arrangement of the dwelling-house have been (1) climate, (2) the social position of woman, (3) the habit of the society generally, whether hospitable and social or otherwise, (4) the degree of privacy thought necessary indoors, and (5) the state of police and government and the degree of security guaranteed to life and property. All these circumstances influence the arrangement and architectural treatment. The influence of climate is too obvious to need more than an allusion. In a hot and comparatively rainless climate the window openings diminish, and are covered with blinds or screens which may form an important decorative feature; cornices project for shade; open loggias or verandahs abound for the same reason; the roof is flat, partly because there is no need to make it otherwise, partly because it is a place for coolness when the sun is down. In the cold and rainy climate the loggia is rare, the windows expand and are constructed to take in all the light they can; the roof rises into a slope. The social position of woman indicates whether the house shall be divided into two distinct portions or be planned as a united whole. The habit of the society as to hospitality and free intercourse will stamp itself to a certain extent on the dwelling, which will have its wide and ornate entrance-door to invite access, or its narrow wicket jealously guarded, according as its owner does or does not wish to entertain strangers; will present an external attractiveness and cheerfulness, or an exterior blank wall with all the amenities of the architecture turned within. The degree of privacy rendered requisite by the manners of the day of course affects the type of the house most decidedly. In the simplicity of early Mediæval days, when all lived in the same room by day and all, or nearly all, slept in the same room by night, house-planning was a very simple problem: as more refined manners demand greater privacy the house divides itself up into separate rooms, and is even planned with corridors and staircases for a separation of traffic. An intermediate stage between the two conditions is that in which one central living room or hall suffices for all purposes, and sleeping rooms and other smaller rooms are divided off around it. We have a survival of this in the central hall which is so common a feature in large mansions of the modern era. The introduction of this feature in smaller houses is an idea of the present day which has been carried out occasionally, and which will probably receive more development, though the liking for it may be said to depend more on architectural than on social motives. There is no better means of giving dignity to a comparatively small house than to give it a large central apartment fit for partially living in; there is all the difference in the world between such a house

in point of effect and spaciousness of appearance, and one with the mere "entrance hall and staircase" of the average dwelling-house: but of course it is not economical. The fifth influence named, that of the state of government and of security to property, affects the house to some extent on the same lines as the third; an owner may be glad enough to see his friends, but if he has to provide against the forcible entrance of his enemies, or any who may choose for the moment to fancy themselves such, his house will have to be constructed accordingly: it must, if it be not principally a fortress, partake more or less of the character of one.

Large palaces, which are exceptional buildings, are not so interesting or instructive in connexion with the subject as ordinary dwelling-houses; and hence the plan of the Palace of Sargon, introduced as an illustration of the Assyrian house, seems rather beside the mark, and the illustration of the "Maison Assyrienne de l'Exposition de 1889" is beside the mark in the opposite direction; it all runs to height, a tall building on a small base, and seems rather like a piece cut out of a building than the whole building. This was a natural result of the necessity for keeping these model representations of houses within bounds as to size and cost, and it would have been better and more to the purpose if the authors had abstained from reproducing the imitation buildings of the Exhibition, confessedly imperfect and got up in a hurry, and had directed their efforts to making new drawings representing what we might really conceive the original buildings to have been. None of the models of the Quai d'Orsay, with the exception of some of the primitive dwellings and huts of savages, produced this impression; they showed characteristic details, but not complete buildings, and it would have been better to have forgotten them now, as temporary structures which had served their purpose, but which were not quite suitable for introduction into an important publication intended to be of permanent interest. We certainly cannot think that the "Maison Phénicienne," which is admitted by the authors to be "in part hypothetical," reproduces with any probability the civil architecture of the Phœnicians, or "may be considered as the type of one of their constructions." On the contrary, it strikes us as a remarkably Parisian piece of archæology. Nor is it by any means safe, as in the chapter on the habitations of the Etruscans, to take urns in the form of houses as models of the habitations themselves, which seems to have been the case with the Etruscan house of the Quai d'Orsay. In all ages such representations, like the representations of buildings on coins, have been mere reminiscences rather than copies of the actual building. They give hints as to some general features, but not more. There are coins representing the temple of Diana at Ephesus, which in certain respects confirm the descriptions and agree with the discovered remains of the building, yet how utterly unlike they are to what we now know the building must have been. Had we taken those as guides to a restoration of it, before Mr. Wood's discoveries, what a grotesque idea of it we should have evolved. Yet this seems to be very much what the authors of the work before us have been doing with some of their models.

We cannot help feeling a certain scepticism, also, about such illustrations as those of the peasants' houses on the borders of the Red Sea (page 362) which are intended to show the *origines* of the Greek columnar style. They seem too good to be true; they do not impress one as sketches taken on the spot so much as illustrations worked up to take their place satisfactorily as links in a chain of evidence which it is desired to establish. We are not told by whom, when, or where they were taken; a frequent defect, we may notice, in French works of this description. Such documents cannot be too precisely authenticated; but we get no authentication.

All that we mean to imply is that this is hardly a book to be taken *au pied de lettre* as a historical treatise. It is a remarkable work in its extent, its admirable and fascinating literary quality, its profusion of illustrations, and the immense amount of ground it covers; it is full of brilliant suggestion, and is a volume of such extent and elaboration that it is impossible to do justice to it, or even to give an adequate idea of its contents, within the limits to which such an article as this must be confined. But the very extent of the subject-matter is such as no one without superhuman faculties could have adequately dealt with in less than a lifetime, if indeed it is not more than enough for any one lifetime. It must be regarded rather as a remarkable and brilliant effort to convey in one volume a comprehensive sketch of a subject which is almost endless in its ramifications. As such it is well adapted to increase the interest of cultivated readers generally in the subject of architecture and architectural history. It can hardly take its place as a book to be relied on as an unimpeachable authority. But it must be read with interest, even with enthusiasm, by all who are interested in architecture.

NOTES.

THE exhibition of students' drawings at the Institute held during the past week in connexion with the annual awards of prizes and studentships cannot be considered a strong one. Although much solid and good work has been done amongst the old buildings, the designs are distinctly below the average. It is an exhibition, in short, rather of draughtsmanship than of design. Nine competed for the Soane Medallion—the subject being a chapter-house with an approach from a cloister—Mr. Rimmer being the successful one. His design consisted of an octagonal chapter-house of somewhat florid detail surrounded by an ambulatory, this latter taking the form of shallow semi-octagonal chapels between the angles. The perspective, showing the building perched on the edge of a cliff, though perhaps hardly the most likely position to be chosen, undoubtedly added some dignity to a design which was not in itself remarkable for originality or power. Mr. Begg's design, placed second, seemed to us distinctly more dignified, the plain wall space over the window-heads giving it repose; the window-jambs appear weak, however, and either a thickening of the buttresses or the carrying down of another order from the window-head would have given it more apparent strength. The others were not remarkable for their design; one or two were, however, for their draughtsmanship. The Tite prize, won by Mr. T. R. Kitsell, was for a church-steeple, and there were four competitors. Three competed for the Grissell medal—a stone railway-bridge—and two for the Masonry prize. At the further end of the room were exhibited Mr. Greenslade's sketches made during his Pugin tour last year—carefully pencilled drawings of Lincoln, Ely, and Norwich. One of the best was a measured drawing of a bay of the presbytery aisle at Lincoln. Mr. D. J. Blow has been elected Pugin student for the present year, and although we have seen the drawings submitted before, they promise well for the sketches and measured work to be done by him. Mr. Chas. A. Nicholson is placed second, and sends some careful pencil sketches and measured work. The absence of coloured work and measured drawings finished in ink, in competition for the Pugin, is noticeable in the majority of cases. The silver medal has been awarded to Mr. R. S. Balfour for a careful and valuable series illustrating Heriots Hospital at Edinburgh. A good set of drawings of Castor Church, Northants, was among those sent in, and there were also on the wall sets of drawings of the Salisbury Chantry at Christchurch, Hants, and the very beautiful Chapel at the Hospital of St. Mary, Chichester. We give a list of the prize-winners on another page.

FROM a memorial addressed by the Governors of the Manchester Royal Institution to the Mayor of Manchester, a copy of which has been forwarded to us, it appears that the Royal Institution Gallery, in which the autumn picture exhibitions at Manchester have been held hitherto, is now so far occupied by pictures bought for the permanent collection that it no longer affords adequate space for the annual exhibition, unless by the process of taking down and temporarily storing away all the pictures of the permanent collection to make room for the annual exhibition, which we agree with the memorialists is a most undesirable process, both in regard to the pictures and the public. The memorial therefore prays that the Corporation of Manchester would turn their attention to the provision of a new gallery for Manchester, suitable for the Autumn Art Exhibitions, and which might be useful for other purposes of exhibition at other times of the year. The memorial concludes,—

"We feel very strongly that Manchester, so rich in its private collections, ought to maintain its position in relation to its public collections, and as an art centre generally, it should not be allowed to fall behind Liverpool, Birmingham, Edinburgh, or Glasgow. The latter city is, at this moment, maturing plans for a new art gallery, on a very large scale, and, as they have given great consideration and attention to the requirements of such galleries, we think it would be well to make inquiry as to the exact nature of the project."

We will add one recommendation. If a new Exhibition Gallery is built for Manchester, let it be planned from the first to provide rooms not only for painting and sculpture, but for architectural drawings and models and for decorative design, and thus set an example of breaking through the superstition that "art" means only pictures and sculpture.

ON last Tuesday evening, in the Elgin Room, British Museum, Miss Eugénie Sellers gave the first of what promises to be a highly successful course of lectures upon Greek Art and Life, as promoted by the London Society for the Extension of University Teaching.* Miss Sellers's addresses have for their subject Greek Sculpture in the fifth century B.C., as illustrated by the Parthenon and its marbles. She invoked her audience to clear their minds of all pseudo-sentiment and unreasoning rapture, reminding them that the Athenians were as human as ourselves, and that their art, albeit beautiful and matchless, is in some points not absolutely perfect. This she illustrated for the moment by pointing out how even Pheidias in his Ionic frieze of the cella, or νεὼς, failed at the junction of the two ends of the ribbon, as it may be termed, which represents the Panathenaic procession. Miss Sellers glanced further at shortcomings in the direction of decorative arts as applied to their buildings, as contrasted with the Renaissance. She briefly compared the sculptures of the friezes of the Parthenon and of the Phigaleian temple to Apollo Epicurius, or the Deliverer, near to Bassæ, in Arcadia,—though of the same date. She referred to the labours of Wood and of Professor Cockerell in preserving sculptured remains of the Artemision at Ephesus, and Apollo's temple in Phigaleia; and gave an able description of the frigid reception that was accorded to the Elgin Marbles upon their arrival in England, when Haydon, the painter, stood almost alone in combating the supineness,—and, indeed, the hostility,—of the Committee who deliberated upon their purchase for the nation. The class was then taken into the Harpy-tomb, the Phigaleia, and Halicarnassus rooms, where some of the objects are being re-arranged so as to form, in a measure, a chronological exposition of Grecian sculpture.

FROM an advertisement in our columns it appears that engineers are liable to have the same liberal conditions extended to them in competitions which are frequently offered to architects. The Corporation of

* The latter five lectures upon the daily life and thought of the Greeks will be undertaken by Miss Millington-Lathbury.

Beaumaris offer a premium of ten guineas for the best design for a Promenade pier, to cost 3,000*l.*: a contemptible sum even as a premium. But they proceed to say that their decision as to the merits of the designs will be final, that the design for which they give the munificent sum of ten guineas is to remain their property, and that they do not bind themselves to carry out any design submitted. What class of engineers (or architects) do they suppose will respond to such an advertisement?

WE have received a circular from the "Artistic and Literary Association, Limited," which, we are told, is the designation of a new publishing company whose chief object is "to afford to those of its members who are artists or authors the unique advantage of sharing as publishers as well as originators in the profits accruing from their own works." We fear we fail to understand the exact meaning or object of the institution. We have always been under the impression that authors did participate in the profits of the sale of their works—at all events that they can make arrangements to do so unless they prefer to sell outright; and artists are not in the same position, inasmuch as a work of art is a single production, and not a thing to be multiplied in subsequent editions like a book.

THE exhibition of pictures by Mr. H. W. B. Davis at the Gallery of the Fine Art Society in Bond-street is one of the most satisfactory of these personal exhibitions which we have lately seen. Mr. Davis's "landscapes with cattle," as they may mostly be termed in the old crusted catalogue phrase, have the peculiar charm of combining realism and finish with poetic sentiment. There is no slurring over of detail, but the broad effects and the sentiment of nature are always present; and the animals introduced in the pictures, though finished and learned enough to hold their place as animal paintings alone, never seem to obtrude on the landscape; they take their part with it as a portion of the materials of the picture in a perfectly natural manner. Perhaps this result is partly due to Mr. Davis's method (as described in the prefatory notice to the catalogue by Mr. M. Phipps Jackson), of making a complete picture of the landscape first, and then introducing the groups of cattle. But Mr. Davis's landscapes do not depend on the cattle element for their interest; many of them are landscapes pure and simple, and very beautiful examples of landscape painting. Among those in this collection may be specially named "Now came still evening on" (7); "Sunny evening in April, Picardy" (20); No. 27, a study for No. 7, and in some respects finer in effect than the larger picture; "A break in a rainy sky" (32): "Conyhurst Hill, Surrey" (42). Some of the most powerful things are among the smaller studies, "Cloud and Sunshine" for instance (12), a grand little study of sky; and one cannot but remark on Mr. Davis's peculiar power of giving an effect of real light and radiance to the moon in his evening scenes; a point in which his works of this kind remind one much of Daubigny. One of the most remarkable things in the room is a sketch of moonlight effect (49) in a night sky covered with broken clouds whitened by the moonlight; the effect is remarkably true, the more so as Mr. Davis avoids the mistake of many painters of moonlight, that of showing too much detail. We should much have liked to have seen in this Exhibition a painting of Mr. Davis's earlier period, which was known to many in the collection of the late Mr. Pfeiffer of Putney; a painting of a down with sheep, showing one of the most remarkable studies of foreground vegetation we have ever seen. It is very different from the manner in which the artist paints now, but not the less excellent of its type. We know not what has become of the picture. The late owner wished it presented to the National Gallery; it was declined on the ground that it was the work of a living artist, though there are works by living artists (not the equals of Mr. Davis) already in the gallery.

A COLLECTION of Mr. Walter Severn's pictures and sketches in water colour is on view at the rooms of the Dudley Gallery Art Society, of which Mr. Severn is president. The result is not altogether satisfactory. Seen apart, many of these works would give the impression of considerable power over bright sunlight effect, and careful finish. Seen together, they give the impression of mannerism and repetition of rather superficial effects, especially in the treatment of water. Among those we like best are "Loch Gougha" (13), "Balloch Pier" (18), "Conway Castle" (22), "Netley Abbey" (30), "The South Stack, Anglesey" (31), and "Evening, Loch Lomond" (44). Mr. Severn paints architecture well and carefully, and we should have been glad therefore to have seen more architectural subjects in the collection: the view of Netley Abbey ruins is admirably like the place. But the landscapes hardly gain by being shown collectively.

IN reference to our "Note" last week as to an advertising architect who called himself "An Associate of the Institute of Architects," we are informed that the person in question is *not* a member of the Institute. He "ceased to be a member" some time since by a resolution of the Council in accordance with the provisions of one of the Bye-laws. The case is occupying the attention of the Institute authorities.

NOTES ON CHALICES AND PATENS.

THESE have been made of various materials in different ages of the Christian Church,—gold, silver, brass, tin, pewter, wood, stone, horn, glass, and in many Canons and Councils one sort would be ordered and another proscribed.

Becon says: "The cup wherein the Sacrament of Christ's blood was ministered, which we now commonly call the chalice, was in the time of the Apostles and of the Primitive Church made of wood. But Pope Zephyrynus commanded chalices of glass to be used in the year of our Lord 202. And afterwards Pope Urbanus ordained that the chalice should be made either of silver or of gold in the year 227." (Works 3, 262.)

This assertion probably only applies to certain countries, as six centuries later orders had to be made with regard to the material employed. St. Chrysostom, however, speaks of a "gold or jewelled chalice," Hom. 50 on St. Matt. St. Ambrose says, "Sacraments need not gold;" and sold his church plate to relieve captives. The Legatine Council of Cealcythe, A.D. 785, c. 10, forbids the chalice or paten to be made of horn; Elfric's Canons, A.D. 975 requires the sacred vessels to be made of wood; Edgar's Canons, a few years before, 960, require metal, and forbid wood. The Canons of Winchester, 1071, c. 11, forbid wax or wood. Richard's Canons, 1175, require gold or silver; the Council of Rheims, 630, allows tin, but not brass. Hubert Walter, 1195, c. 9, requires silver.

One ancient reason for discarding wooden chalices is because the wine soaked into the wood, as is shown in the following quaint passage in the Black Letter volume, "The Pageant of the Popes," date 1555:—

"Zephyrinus was a Romaine borne, a man, as writers do testifie, more addicted with all endeavour to the service of God than to the cure of any worldly affayres. Whereas before his time the wine in the celebrating the cōmuniō was ministered in a cup of woode, he first did alter that, and in steade thereof brought in cuppes or chalices of glasse. And yet he did not this upon any supersticion, as thinking woode to be unlawefull, or glasse to be more holy for that use, but because the one is more comly and semely, as by experience it appeareth, than the other. And yet some wooden doultes do dreame that the wooden cuppes were chaunged by him because that part of the wine, or as they thought the royall bloud of Christe did soake into the woode, and so it cannot be in glasse. Surely soner may wine soake into any woode than any witte into those winie heads that thus both deceive themselves, and slaunder this godly martyr who, in the yeare of our Lorde, 220, suffered martyrdom under Aurelius."

Gold and silver chalices were probably in use from the earliest Christian times, and wood and stone were most likely used in the poorer churches. The Council of Tribur, in 895, did not ordain that chalices must be of the precious metals, but only forbade their being of glass or wood.

In the ancient Irish churches stone chalices were very usual.

Pre-Reformation chalices in England are very scarce; indeed, Mr. Cripps says he can find but half-a-dozen. The finest of these are at Wiveliscombe, in Somerset; Bishop Fox's chalice at Corpus Christi College, Oxford; and Sir Thomas Pope's chalice at Trinity College, Oxford. Of the communion cup, with its cover (temp. Ed. VI.), there are still fewer examples than of the earlier ones. There is one of 1548-9 at St. Lawrence, Jewry, two at St. Margaret's, Westminster, of 1551-2; and others of the same date at Hunstanton, Norfolk, and Totnes (Devon).

A beautiful specimen of an ancient paten is at Wyke, near Winchester. It is of silver, formerly gilt, of which traces are very faintly to be seen. The design consists of an Agnus Dei, in a sunk central circle, round which eight ornamented foils are described, while round the whole, on the rim, is the following inscription:—

"✠ CUNTA (cuncta?) CREO: VIRTUTE: REGO: PIETATE: REFORMO."

In the Christy collection are two patens, which were found on St. Louis Hill, Carthage, with chalices, liturgical spoons, and seals. They are inscribed respectively, "Feliciter loquere," and "✠ DD. ICRESCONI CLARENT."

About 1854, a Cork jeweller bought a chalice from an Irish peasant, who had found it in a bog near Berehaven, in West Cork. It was a silver one, richly adorned with a foliage design, enclosing a cross over a skull. Near the rim, in a small compartment, was a cock. The bulb, beneath the cup, was chased in Norman style, similar to the type on some silver pennies of the Conqueror; over this bulb was I.H.S. inverted. It weighed 12 oz., and was richly gilt. On the rim was the inscription, "Cornelius O. Sullivan Sacerdos Me Fieri Fecit 1597 Dulcis Jesus Gloria Soli Deo Sa Ma O. P. N."

The same jeweller had another chalice, an octagon one, with scroll-work, and the following symbol: the Cross, on the left a ladder, and on the right a spear; a heart transfixed with two arrows in saltier, and the letter H surmounted with a Cross *patée fitchée*. The inscription ran thus,—"ORATE PRO ANIMA D. DANIELIS SWYNYE SACERDOTIS LISMORENSIS DIŒCESIS QUI ME FIERI FECIT A° 1640." It weighed about 16 oz.

Another Irish chalice was inscribed,—"MAURICIUS COSTUN SACERDOS HANC CALICEM DD. ALTARI CAPELLÆ BEATÆ MARIÆ CLOIN, 1607."

The next two inscriptions are on chalices in two churches (R.C.) in Cork:—

"DEO OPT MAXIMO ANO DNI 1598
DEDICABAT ALSONA MIAGHAE HUNC
CALICEM UT PRO ANIMÆ SUÆ
SALUTE JUGITER AD DEUM ORETUR."

And

"✠ Fr. Gulielmus irris Pro Conv^{tu} S^{ti} Fran^{ci}
Corck Me Fecit Fieri 1611."

Both these run round the rim of the base. In Rheims Cathedral is a most splendid chalice of the eleventh century, gold, most beautifully set with diamonds, pearls, and rubies of priceless value. It belonged in old times to the church of St. Remy, and is known as the chalice of St. Remy. On the band is deeply cut—

"✠ Quicumque hunc Calicem invadiaverit vel ab Hāc (hanc?) Ecclesia (Ecclesiam?) Remensi Aliquo Modo Alianaverit (alien averit?) Anathema sit Fiat Amen. ✠"

Inventories of the vessels existing in various English churches before the Reformation, and those taken at the time of the Reformation, show that the churches had gradually acquired gold and silver and precious stones, in the form of shrines, images, reliquaries, vestments, sacramental vessels, &c., to a great value. The Commissioners of Henry VIII. and Edward VI. visited all the monastic and collegiate churches, to despoil them of all that was most valuable, which was confiscated to the King's use. The seizure of the parish plate was not decided upon till the last year of Edward VI., and probably then only partially carried out. Later, on the accession of Elizabeth, inquiries were

made about the Church plate, and then it was found a great deal had disappeared, sold by churchwardens to save Church rates in some cases, or stolen by them, or their superiors.

Later, even in the present century, through ignorance, old Church plate has been exchanged for more admired and much less valuable modern plate, or some may have been simply stolen and sold to pawnbrokers und silversmiths. Other plate has been burnt with its church, or perhaps when housed in the vicarage. At Tawstock, in Devon, was a cup, dated 1576, which, with other very good Church plate, was stolen in 1841, and the thieves were never traced.

Hasted says of a Kentish church in his history: "When dressed up for the Sacrament, and covered with its costly and splendid service of rich plate, it has an appearance of grandeur and magnificence that blots from the mind as far as possible a regret for its having been bereaved of its former ornaments. All the plate (except the two great candlesticks) was new gilt, which altogether make a very handsome and splendid appearance."

Early in this century a silver chalice, dated 1337, was mentioned as being in Pakefield, near Lowestoft, but has long disappeared.

The inventories of Church plate taken in Edward VI.'s time are not all extant, but the following is taken from the MS. of the Cumberland inventory of 105 churches. "Of these churches eighty-seven had each but one silver chalice, fourteen had each two silver chalices, and four had each three. Eight had tin chalices, and two had none at all. Nothing else of silver was in any of the churches, except one broken cross and one pyx. There were but three other pyxes, one of which was of copper gilt, and another of latten; the description of the third is torn off. Only one church had cruets, and those of tin for the wine and water at the altar. Twenty churches had candlesticks of brass or latten. No paten or cover is mentioned. Nor is the weight of anything specified." This is a poor record of Church plate compared with that of many counties, but, however, all was fish that came to the king's net! Bishop Boniface has a quaint saying *re* wooden chalices: "When priests were gold, the chalice was of wood; now when the vessel is of gold, priests are wooden." He and St. Ambrose would have agreed in thinking against many contrary opinions of their times that Church plate can sometimes serve humanity better than by being kept sacred in the churches.

Two chalices, each with three bells hung around them, dated 1460 and 1530, were exhibited at Lisbon by the Royal College there. Possibly, they may have been ciboriums or pyxes; and, if so, the bells rung as they were carried along, and so would serve to give notice of the approach of the priest carrying the Blessed Sacrament.

Among the parochial payments of S. Andrew, Holborn, in 1558, is noted "Paide for the exchaunge of two chalices with the covers, weighing xxxii oz. halfe, for a communion cup waying xxx oz. and halfe, the exchaunge with the odd oz. at xiiijs. viijd."

Of old it was the custom to place a chalice and paten, symbolical of his office, upon the breast of a priest in his coffin. William of Bleys, 1229 A.D., ordered that a parish should, in addition to the usual sacred vessels, always keep an unconsecrated chalice, which might be of tin, for burial with the priest (see Wilkins, i. 623). Several examples of these mortuary chalices so buried have been found and preserved,—at Cheam, Surrey; Nettlecombe; and at Corpus Christi College, Oxford. The two latter have patens, silver, with a broad rim, the centre sunk in a sexfoil pattern, with an engraved head of our Lord in the middle.

The following notes from the List of Church Goods in Cornwall, Augmentation Office, 6th Edward VI., are interesting:—

"The p'ish of Delyn (St. Endellion), the sayde p'ishners have ij chalises p'cell gylt.

The Parishe of Egloshayle the sayde parishe hathe ij chalics of sylver."

In the Bodmin Corporation records, among the assignment of goods to the Church, in 1566, is "for ye commyon tabell ij polys, one of brasse, and a nother of yron. One comouyn cup of sylver and one other gylt, w^ch hery cock vsed at weddynges." There may be others, but the document is so faded and worn as to be in many parts quite undecipherable.

At Blisland is an old chalice, still in use, but the cover is lost. It is thus noted in the Parish Register:—"Anno Dmi, 1604. At the Easter Anno pd. George Marrett did freely give and deliver one fayre silver cup w^th a cover therevnto double gilted to remayne for a comunyon cupp for the parishe of Blisland, w^th out any clayme." At Minster (also in Cornwall) are two "fayre sylver chalises" with covers, one very ancient.

C. F. Y.

ROYAL INSTITUTE OF BRITISH ARCHITECTS:

AWARD OF MEDALS AND PRIZES.

AT the business general meeting of the Royal Institute of British Architects, held on Monday evening last, the following report of the Council on the award of medals and prizes for the year 1891-92 was received and adopted:—

"Gentlemen,—In accordance with the provisions of By-law 66, the Council have the honour to report that they have examined the several essays and drawings submitted for the Silver Medals of the Royal Institute, the Soane Medallion, the Pugin Studentship, the Godwin Bursary, the Tite Prize, the Grissell Medal, and the Scientific Masonry Prizes.

The Essay Medal and Twenty-five Guineas.

Five Essays were submitted for the Silver Medal of the Royal Institute, the subject being 'The architectural treatment of the Fireplace and its accessories,' under the following mottoes:—i. Ignigenus. ii. Lincoln Green. iii. Pro aris et focis. iv. Terra del fuego. v. Veritas filia temporis.

The Council have awarded the Silver Medal and twenty-five guineas to the author of the essay bearing the motto (v) 'Veritas filia temporis,' as showing the best literary treatment of the subject, and as being adequately illustrated; and they desire to honourably mention the essay bearing the motto of (i) 'Ignigenus,' as possessing merit, principally in the illustrations.

The Measured Drawings Medal and Ten Guineas.

Three sets of measured drawings were received for the Silver Medal of the Royal Institute, under the following mottos:—i. Black spot,—Salisbury Chantry, Christchurch. ii. Nitor,—Heriot's Hospital, Edinburgh. iii. Pollux,—Castor Church, Peterborough.

The Council have awarded the Silver Medal and ten guineas to (ii) Nitor, for measured drawings of Heriot's Hospital, Edinburgh; and a Medal of Merit to (i) Black Spot, for measured drawings of the Salisbury Chantry at Christchurch, Hants.

The Soane Medallion.

For the Soane Medallion and, subject to the conditions laid down, £100 for foreign travel, nine designs for a Chapter-house were submitted, under the following mottoes:—i. Abbotsbury; ii. Anno 1891; iii. Byzantium; iv. Ex-cathedrâ; v. Griffin; vi. Red Cherub; vii. Sun; viii. Plume; ix. Volunteer.

The Council have awarded the Medallion, with the sum of 100*l.* for foreign travel as laid down in the conditions to the design bearing the motto (i) 'Abbotsbury;' and a medal of merit to the design bearing the device of a (vi) 'Red Cherub.'

Pugin Studentship.

For the Pugin Travelling Studentship applications, each with a select number of drawings and sketches, were received from the following gentlemen:—i. Mr. Detmar J. Blow; ii. Mr. Erskine S. Cumming; iii. Mr. Charles R. McIntosh; iv. Mr. Charles A. Nicholson; v. Mr. Percy D. Smith.

The Council have awarded the Studentship to (i) Mr. Detmar J. Blow, born in November, 1867, whose measured drawings of Beauvais Cathedral and of Barfreston Church have afforded him admirable training; and they desire to record that Mr. Blow received a medal of merit for drawings submitted for last year's studentship, and that he was honourably mentioned in 1890. The Council have also awarded a Medal of Merit to (iv) Mr. Charles A. Nicholson, born in April, 1867, for a fine set of drawings.

Godwin Bursary.

For the Godwin Bursary applications were received from the following gentlemen:—i. Mr. Owen Fleming, *Associate*. ii. Mr. Banister F. Fletcher, *Associate*. iii. Mr. Edwin O. Sachs. iv. Mr. T. Locke Worthington, *Associate*.

The Council have awarded the Bursary to Mr. T. Locke Worthington, *Associate*, who proposes to visit France, principally for the purpose of studying tenement buildings.

The Tite Prize.

For the Tite Prize—being a Certificate, and, under conditions, 30*l.* for travel in Italy—four designs for a Church Steeple were submitted, under the following mottoes:—i. Ashlar; ii. Quis; iii. Red Lion; iv. Design in a Circle.

The Council have awarded the Certificate and, subject to the conditions laid down, 40*l.* for travel in Italy, to the design (iii.) bearing the device of a Red Lion.

The Grissell Medal and Ten Guineas.

For the Grissell Gold Medal, for design and construction, three designs for a stone railway bridge were submitted, under the following mottoes:—i. Equilibrium. ii. Fundamentum forte opus sustinet. iii. Jacta est alea. The Council have awarded the Grissell Gold Medal and ten guineas to the design bearing the motto of (iii) 'Jacta est alea.'

The Scientific Masonry Prizes.

For the Scientific Masonry Prizes of six guineas and four guineas two designs have been submitted of the vaulting of an octagonal turret, under the following mottoes:—i. Saxum (with a model). ii. Voussoir.

The Council have awarded the prize of six guineas to the design bearing the motto (i.) 'Saxum'; and the second prize of four guineas to the design bearing the motto (ii.) 'Voussoir.'"

It was subsequently announced that the authors of the premiated or commended essays, designs, and drawings before referred to were as follow:—

"Veritas filia temporis," Mr. Charles E. Sayer, A.R.I.B.A. "Ignigenus," Mr. Richard Glazier, A.R.I.B.A.

"Nitor," Mr. R. Shekleton Balfour. "Black Spot," Mr. Percy D. Smith.

"Abbotsbury," Mr. Heber Rimmer. "Red Cherub," Mr. John Begg, A.R.I.B.A.

"Red Lion," Mr. T. Rogers Kitsell, A.R.I.B.A.

"Jacta Est Alea," Mr. Harold Harlock.

"Saxum," Mr. Herbert S. Wood, A.R.I.B.A.

"Voussoir," Mr. Erskine S. Cummings.

ARCHITECTURAL SOCIETIES.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY (INCORPORATED).—A general meeting of this Society was held at the Rooms, Albion-place, Leeds, on Monday last, the President, Mr. W. H. Thorp, F.R.I.B.A., in the chair. Mr. J. M. Brydon, F.R.I.B.A., read a paper entitled "The English Renaissance." After briefly sketching the rise and development of Italian Renaissance, and showing the influence it had upon the English type, Mr. Brydon, taking such well-known typical examples of the English school as the contemplated palace at Whitehall, Ashburnham House, St. Paul's Cathedral, Blenheim, Somerset House, &c., dwelt upon the genius of their great designers, and the other masters of the craft of that period and later periods. Inigo Jones, who set on foot the English style, which in many respects possessed worthier features than its prototype, and which has left us in these days a precious heritage to study and maintain; Sir Christopher Wren, whose *magnum opus*, St. Paul's Cathedral, although marred by the architect having to follow the Cathedral form, and adapt the new style to the old Mediæval type of plan, instead of following his own bent, is, in Mr. Brydon's opinion, one of the greatest ecclesiastical structures of this style in the world. Mr. Brydon commented on the various distinctive features and characteristics, and drew from the examples lessons for the guidance of students of architecture of the present time.

LIVERPOOL ARCHITECTURAL SOCIETY.—This society has established a series of students' classes for the study of various subjects connected with architecture, building construction, and sanitation. Lectures are to be given by architects and engineers on the various subjects specified. Students' meetings are to be held weekly during the session.

MANCHESTER SOCIETY OF ARCHITECTS.—In a circular issued by the Education (in Architecture) Committee of this Society, it is stated that one of the leading objects of the re-construction of the Society was to afford facilities for the study of architecture, other than such as are found in ordinary office routine. This has now been to some extent accomplished by the formation of two classes for instruction in

Bermondsey Public Library. Mr. J. Johnson, F.R.I.B.A., Architect.

(1) History and Development of Architecture, and (2) Materials and Construction, which will be open to students, whether members of the Society or not. Mr. H. E. Stelfox, A.R.I.B.A. (Ashpitel Prizeman, 1888), has been appointed Lecturer, and the classes will be held weekly, at the Society's Rooms (Literary and Philosophical Society, 36, George-street), commencing from Monday, the 18th inst. Any further information may be obtained from the Hon. Sec. of the Education Committee, Mr. Ph. E. Barker, 24, Brazennose-street, Manchester.

DUNDEE INSTITUTE OF ARCHITECTURE.—On the 14th inst. Mr. R. C. Ritchie, of the Electric Construction Corporation, Limited, London, delivered a lecture to the members of the Dundee Institute of Architecture, Science, and Arts, on "Electrie Light Supply." Mr. William Mackison, C.E., presided, and there was a good attendance. The chairman, in introducing the lecturer, made a few sympathetic remarks regarding the death of the Duke of Clarence. At the conclusion of the lecture several questions were put to Mr. Ritchie, who, in reply, said that electric light cost about 50 per cent. more than gas in London, and he predicted that in a short time they would be able to produce it at as cheap a rate. Regarding the propelling of tramway cars by electricity, he said that it was all a matter of traffic. If there was little traffic horses would be the cheapest, but where there was a large service, electricity would be preferable. On the motion of the chairman, Mr. Ritchie was accorded a vote of thanks for his lecture.

PUBLIC LIBRARY, BERMONDSEY.

THIS building was opened last Monday by Sir John Lubbock. It has been built from the designs and under the superintendence of Mr. J. Johnson, to whom we are indebted for the accompanying sketch of the building.

The principal entrance in the centre of the building, emphasised by an Ionic portico, leads to a hall and staircase, 15 ft. wide; on the right is the newspaper reading-room, 41 ft. by 33 ft. Immediately opposite the entrance is the lending library, 41 ft. square, fitted with cases for 20,000 volumes. "Cotgreave's" Indicators are used for ready reference. The librarian's-room and residence, with private access to lending department, adjoins the main entrance, thus giving complete control of the building. The stone stairs, with central and return flights, terminate in the large first-floor landing, paved with marble mosaic; the landing is arcaded at the sides, and has a large cove with lantern-light in the centre. The reference library is 41 ft. square, with a domical roof in the centre, supported by four Corinthian columns. It is lighted by the clearstory at the base of the dome, also by the windows in the side walls; the reading-tables are in the centre, the bookcases are arranged on the alcove plan around the sides. Next the landing is the magazine reading-room, 41 ft. by 24 ft.; adjoining is the ladies' reading-room, 20 ft. by 16 ft., with lavatory accommodation. On this floor is the commissioners' committee-room, with separate access from the exterior. The whole of the second floor is occupied by the librarian's apartments, forming a complete residence, with bath, larders, stores, coal-lift, and every residential convenience. In the basement are provided lavatories, &c., for the general readers; also a large space for additional book-store when required, a bookbinding-room, a general store-room, coal-cellar, and heating chamber. There is a side entrance for cases, &c., also a special staircase for the attendants, with a book-lift, so that every portion of the building can be conveniently reached without entering the principal staircase. Mr. Johnson's design was selected out of fifty-seven submitted in public competition. The builders are Messrs. F. & H. F. Higgs, of Loughborough Junction. The iron construction was executed by Mr. Dawnay; the warming (by radiators which keep a satisfactory temperature) was executed by Mr. J. Todd, of Wandsworth, who also provided bells and speaking-tubes; the marble mosaic by Messrs. Diespecker & Co.

The exterior is of Renaissance character, freely treated, executed in red Elham bricks, with dressings of Monks Park Bath stone; the carving has been executed by Mr. Baird, of Herne Hill, from the architect's designs; the central figures of "Literature" and "Science" are by Mr. Lawlor. The central turret was introduced to give height and dignity to the front, on account of the massive character of the adjoining Town-hall.

THE ARCHITECTURAL ASSOCIATION:

THE DESIGN OF TECHNICAL COLLEGES AND SCHOOLS.

THE first meeting of this Association since the Christmas vacation was held on Friday, the 15th inst.

Mr. Leonard Stokes, past President, was voted to the chair, in the unavoidable absence of the President, Mr. F. T. Baggallay (who was out of town) and of the two Vice-Presidents, Messrs. F. R. Farrow and E. W. Mountford, both of whom, it was stated, were, in common with Mr. E. S. Gale, senior honorary secretary, and many other members of the Association, suffering with the prevailing epidemic of influenza.

Messrs. J. Aldridge and J. E. van Abbott were elected members of the Association.

Mr. F. T. W. Goldsmith, honorary secretary, announced that Mr. T. M. Rickman had promised a donation of five guineas per annum to the Association's general fund, and that the Royal Institute of British Architects had promised to subscribe £100 per annum for three years. These announcements were received with much applause, and on the motion of the Chairman the secretaries were instructed to convey the hearty thanks of the Association to the donors.

The Chairman, in feeling terms, alluded to the lamented death of H.R.H. the Duke of Clarence, and proposed that a vote of condolence with the Prince and Princess of Wales be sent by the secretaries in the name of the Association. This was assented to in silence, all the members standing.

Professor Garnett then read the following paper on "The Design of Technical Schools and Colleges:—

Presuming the governing body of the school or college does not consist of educational specialists, it seems that the first step to be taken is to learn from some qualified person or persons what subjects should be taught in the institution, how they should be taught, and what accommodation and appliances will be required for teaching them. I have the honour of knowing some architects who are themselves educational experts, and if the governing body enjoys the advantage of having secured the services of one of these gentlemen it may proceed with safety without further preliminary; but men who can act in the double capacity of architect and educational expert are exceptional, and properly so, for although we may sometimes with advantage ask the advice of our solicitor not only on the form in which our bequests should be drawn up, but also on the manner in which we shall dispose of our belongings in our wills, it does not appear to me to be reasonable to expect the architect to tell us both what we want and how to secure it.

Hence it is generally desirable that the chief technical teacher, and sometimes two or three other members of the staff, should be appointed at the same time as the architect, though it will not generally be necessary to secure more than a very small portion of the services of the teachers until considerable progress has been made with the building. It should be the duty of the teacher, as soon as he is appointed, to advise the governing body with respect to the accommodation required in the several departments, the relations of these departments to one another, and the special appliances required in each, particularly those for which provision must be made in the building. Attention should be specially directed to the relative positions of the rooms devoted to the several departments, so that while each department forms by itself a compact whole, it should be contiguous to other departments to which it is, in the character of its work, most nearly akin, that the appliances of each department may, as far as possible, be available to those students and teachers in other departments who are most likely to require their use. For example, a photographic laboratory should be situated as near as possible to the chemical laboratory on one side and the art studios on the other. By associating the department of photography with that of chemistry it becomes unnecessary to reduplicate balances and other appliances for quantitative chemical analysis, while by making the art studios readily accessible to the students of photography the best possible facilities are afforded for camera practice and the study of grouping and light and shade. For similar reasons the metallurgical laboratory should, if possible, be placed between the departments of chemistry and of mechanical engineering, so that all facilities for chemical analysis may be readily accessible on the one side, and testing machines for the systematic examination of the mechanical properties of the metals and alloys may be equally available on the other. On the same principle, the department of electrical engineering should adjoin the engineering laboratory and workshops, for the double reason that steam-power may be available, and because every electrical engineer must be at the same time a mechanical engineer. Students of electrical engineering must also have ready access to the physical laboratory; but it is not desirable that the engine and dynamo-room should be geographically near to the physical laboratory, on account of the disturbance to all magnetic measurements which would be caused by the proximity of heavy moving machinery, of powerful electro magnets, and of strong electric currents.

But while it is desirable that the relative positions of the several departments should be carefully chosen, it is of paramount importance that each department should be compact in itself, so that its work may be conducted by the smallest number of superintendents. If the Professor of Chemistry has his students' laboratory at one end of the building, his lecture-room at the opposite end, his preparation-room somewhere near the middle, and his private room in some remote corner, the amount of assistance he will require will probably be doubled. His private room should be as near as possible to his students' laboratory; if it communicates directly therewith a further advantage will be gained; and his preparation-room should adjoin the laboratory on one side, and his lecture theatre on the other.

It very frequently happens that it is not possible to erect at first the whole of the buildings which it is intended ultimately to provide, and the question then arises whether a school or college complete in all its departments should be erected on a small scale, or whether plans should be made for the whole building, as though it were intended to erect the whole at once, and a selected position, representing certain departments only, should be built at first. There is, of course, some inconvenience attending the latter course pending the erection of the remaining portions of the building, but this inconvenience may be made comparatively small by a careful selection of the departments for which provision is at first to be made. If the former method is adopted, the institution will be complete in itself during the early years of its existence; but when the enlargement is carried out, several departments will be partly located in the old and partly in the new buildings, and the conduct of the work of each department will be rendered difficult and expensive. In selecting the departments for which provision should be made at first, it should be borne in mind that work which requires specially-constructed buildings cannot be satisfactorily conducted in ordinary lecture-rooms or class-rooms, while a class on mathematics or modern languages is not greatly inconvenienced if it is required to meet in a room provided with draught closets, or special supports for tables, or lighted as an art studio, or in some other way adapted for a purpose other than that for which the class is assembled; provided only that sufficient space is available for seats and desks, and the room is not one in which it is impossible for a lecture to be heard. Hence it is best to commence with the departments of chemistry, physics, applied mechanics, engineering, and fine art, erecting these departments as completely as the character of the plan for the whole building necessitates. Any rooms in these departments which are not at first fully occupied by the work of the department will be available for classes on mathematics, languages, and commercial subjects, while, at a push, a chemical laboratory will serve very well for biological work.

As regards the position of the several departments, it is desirable that in any institution in which popular lectures, university extension lectures, or any large evening classes form an important feature, there should be a large lecture theatre, as near as possible to the public entrance, and that it should be on the ground floor. This lecture-theatre may be common to several departments, but should be readily accessible from the physical department, as physical apparatus is likely to be very largely used in the theatre, and such apparatus is often very ponderous or very delicate. In this theatre as much length as possible should be given to the lecture-table. For a theatre capable of holding two or three hundred persons a lecture-table 30 ft. by 3 ft. is not too large, and 3 ft. is a convenient height. The table should be carried on its own foundations, the supports being entirely distinct from those which carry the floor, so that any movement of the audience may not disturb the most delicate apparatus on the table. It is generally best to carry brickwork for the support of the table up to within two or three inches of the floor level. The space beneath the table and within the brick wall should be accessible from the lecturer's side, as it may be usefully employed to accommodate resistance-coils and other accessories of the lecture-table. The floor should be carried on walls built a foot or more away from the wall which carries the lecture-table. In the Cavendish Laboratory at Cambridge the lecture-theatre is on the first floor, and the lecture-table is an oak slab carried on an 18-in. wall, which forms one wall of the gateway, the floor being carried on brick piers erected for the purpose, a few inches away from this wall, and this arrangement may be desirable when it is impossible to find accommodation for the lecture-theatre on the ground floor. As much space as possible should be left behind the lecture-table for such apparatus as cannot conveniently be placed upon the lecture-table itself, as well as to give a reasonable length for a beam of light reflected from the mirror of a galvanometer or other instrument on the lecture-table, and observed by the audience as it traverses a graduated scale on the wall behind the lecturer. Eight feet is not too much space to leave between the lecture-table and the wall. The gas or other lights in the room should be controlled by a valve or switch fixed underneath the lecturer's table, and readily accessible to the lecturer.

Another important adjunct to a lecture-theatre is a platform for the magic-lantern, which, like the lecture-table, is entirely independent of the floor of the room or of the gallery supports. For the exhibition of ordinary slides such an arrangement is, of course, unnecessary; but when it is desired to exhibit on the screen the motion of a magnet suspended by a silk fibre, or any other delicately-suspended body, the unconscious movements of the most attentive audience will be sufficient to completely spoil the experiment unless a special support for the lantern is provided. A hollow brick pier standing on its own foundation, and carried up through the gallery without coming in contact with the seats or floor, forms a very convenient support for the lantern. Gas, bottles, and other appliances may conveniently be stored within the pier, and, if an electric lantern be used, the conductors may be brought up from the basement and through the pier, and regulating resistance fixed within the space enclosed by the brick walls, which form an almost fire-proof structure. The windows should be arranged in order to throw the greatest possible amount of light upon the lecture-table, but the room should be capable of being darkened completely. If possible, openings should be made in the ceiling directly over the lecture-table, through which apparatus may be suspended at any height above the table from the floor above. A water-supply and sink should be within easy reach of the lecturer, and a large fume-closet with glass front should be fixed in a position in which the audience can readily see its interior. A chamber heated by a steam jacket, and provided with a glass front, is a very valuable accessory to a lecture-theatre, as it enables electrical and other apparatus to be kept warm and dry and in working order, whatever may be the state of the weather or the hygroscopic condition of the overcoats of the audience.

In the Physical Lecture-Theatre at Newcastle the seats have been so arranged that any person can see the front edge, and therefore the whole top, of the lecture-table over the head of a person who, when sitting down, is $2\frac{1}{2}$ inches taller than himself. This condition gives a slightly concave profile to the seats, but the steepness of the gallery is rapidly reduced if the distance between the lecture-table and the first row of seats is increased. It is only when the length available for the theatre is small and the seats have to be brought very near to the lecture-table that the gallery becomes inconveniently steep.

[*Continued on page* 62.

Illustrations.

DESIGN FOR A LARGE TOWN MANSION.

THE illustrations show the perspective view, section, and principal floor plan of the design to which the Royal Academy Gold Medal and Travelling Studentship of 200*l.* have been awarded this year. The author of the design is Mr. A. H. Hart, Associate of the Institute of Architects, who has given us the following brief notes as to the objects put before the competitors and the manner in which he has treated the problem :—

"The building required was a large town house, planned with a view to the proper placing and lighting of pictures, sculpture, and other works of art. The site was 180 ft. deep, with a frontage of 70 ft.

The problem, therefore, was to secure a symmetrical plan, such as a town mansion required, without in any way sacrificing convenience, and to provide proper accommodation for the display of pictures and sculpture, with efficient light both for the works of art and the house generally. To secure all these properties upon a deep site with no light obtainable on either side made the problem a difficult one.

The house is planned without a picture-gallery, the object being to display the pictures and sculpture in the rooms themselves, so that the inmates may enjoy them upon all occasions. An endeavour has been made to let the works of art form part of the architecture and contribute towards a harmonious whole, rather than to appear independent, as they generally do in a museum.

The first floor is devoted to the state apartments, in which stateliness and freedom of circulation have been aimed at, whereas the ground-floor contains the family living rooms, &c., where comfort is the first consideration.

The house is designed in the François I. style, and an attempt has been made to combine richness with dignity."

"MUNSTEAD CORNER," GODALMING.

THIS house, now approaching completion, is situated about one mile from Godalming. The walling generally is of Bargate stone, the upper story half timbered. The roofs are covered with red local tiles. The chimneys are of red brick.

Messrs. Mitchell Bros., of Shalford, are the contractors, and Mr. Edwin L. Lutyens is the architect.

The drawing of the house was exhibited at the Royal Academy last year.

DESIGN FOR A PROPOSED CHURCH.

THIS church has been designed for a large manufacturing town in the Midlands.

In plan it consists of nave and aisles, with transepts; the vestries are on the north side of the chancel, and the organ-chamber is above them, with openings into the chancel and north transept. The chapel is at the east end of the south transept, and will be vaulted. The chancel, also to be vaulted, has an ambulatory around it. The nave is 30 ft. wide, and has a lofty arcade and a flat-pitched roof of early character.

The church will accommodate 800 persons, and will cost about 10,000*l.* without the tower.

The drawing of the church was exhibited at the Royal Academy last year.

JOHN E. NEWBERRY.

WAYSIDE NOTES IN EAST ANGLIA.

DOORWAY, ST. ANDREW'S-HILL, NORWICH.

THIS doorway leads from St. Andrew's-hill to a passage in the rear of an old flint building known as the Old Bridewell.

It is fifteenth-century workmanship, and is constructed of English oak. The massive frame is moulded, and the four-centred head has carved spandrels, the door being hung on hook-hinges to the frame, and being square headed. Above the arched head is a traceried transom light of open pierced work, but not glazed. Above the traceried panel is a cornice of battlemented moulding. It is a curiously unusual form, and very quaint.

OLD DOORWAY, GUILDHALL, NORWICH.

Though now forming part of the Guildhall, this doorway was not originally built in its present position. It was taken down from an old house formerly standing in London-street, Norwich, and was known as the Bassingham Gate. A drawing exists, published early in the nineteenth century, showing it *in situ* in 1815. The arch is elaborately moulded, the projecting moulds dying upon the caps of columns worked in the jambs on either side. The centre columns are interrupted, and canopied niches are placed in the jambs, the pedestal of the niche being supported by the column, which runs on to the base. The hood mould is crocketted, and, in place of the finial at top, a shield bearing the Royal Arms of England, with supporters, is carved.

In the left spandrel, looking at the doorway, is a filling-in of vine-leaf ornamentations, in the centre of which is a shield bearing the Norwich city arms; the corresponding right-hand spandrel is filled in with roses, and the shield with armorial bearings,—probably the quarterings of the original possessor.

NORTH WALSHAM CARVINGS.

In the pages of the *Builder*, August 24, 1889, there is a short description of North Walsham Church, and allusion is made to the elaborate woodwork and carving, and to the old screen, portions of which are still retained in the church.

I give a sketch of a piece of the screen now worked into the front of a bench, and also a fine poppy-head from one of the bench-ends. It may be mentioned that the church has no special chancel, and the western portion of the tower has collapsed, owing, it is said, to the imperfection of the round flint bonding.

A careful drawing of the Paston monument in the church appeared in the *Builder* of August 31, 1889.

STRANGERS' HALL, NORWICH.

The newel and baluster are from a building in St. Gregory's parish, now known as Strangers' Hall, though believed to be by most archæologists an old fourteenth-century city mansion. It was used at one time as a Guild Hall for the ancient guild of St. George, patron saint of England, and probably received the cognomen of Strangers' Hall from the fact of its having been lent to foreign refugees during the persecutions of the Huguenots. It has a beautifully-carved doorway to the street, and many points of interest inside.

COSTESSEY.

This picturesque locality lies about five miles out of Norwich, and is chiefly famous for its fine old Hall, one of the seats of the Staffords, though not at present occupied by the family. It was built by the Jerninghams in Queen Elizabeth's reign, and consists of a huge quadrangular building, principally in red brick, the details of which are highly ornate. The church does not exhibit any special features beyond a well-proportioned porch, and a picturesque little brick-capped tower, with spirelet of wood.

JOHN S. CORDER.

THE DESIGN OF TECHNICAL COLLEGES AND SCHOOLS.

(Continued from page 61.)

It is imperative that the principal laboratories in the physical department should be upon the ground floor, and that there should be no basement story below them. At least one room should be set apart for exact measurements in electricity and magnetism. The chief tables in this room should be of slate, carried on brick piers, which are built from their own foundations independently of the floor. Professor Ayrton has found it convenient to place slag wool between the brick piers, and slate slabs, instead of fixing the slate to the piers by cement, but the risk of vibration being communicated to the instruments depends greatly on the nature of the soil in which the foundations are placed and on the character of the traffic in the neighbourhood. Other things being equal, that side of the site which is most remote from the public thoroughfares, or traffic of any description, should be selected for the physical laboratory. Professor Herschel's laboratory at Newcastle was within a few feet of the North-Eastern Railway, and the approach of an engine was heralded by the disturbance of his magnets. The side tables throughout the physical department may be conveniently suspended from the walls. A plate of pine, 6 ft. or 7 ft. in height, 6 in. wide, and 2 in. thick, is fastened to the walls by ordinary engineers' bolts, made of Muntz metal, which screw into sockets made of brass or Muntz metal, and built into the walls. Except in the neighbourhood of the electrical-room, iron screws may be employed instead of brass, provided they are carefully protected from rust during the erection of the building by tar, or whitelead and tallow. The plates of pine terminate a little above the floor, and to them are mortised brackets suitable for carrying the slab of teak or ash which is to form the table. By this means we not only secure a table with supports independent of the floor, but for a height of 3 or 4 ft. above the table we have wooden plates, to which shelves or instruments can be attached without interfering with the walls, which in a physical laboratory may with advantage be of bare brick, provided its surface is smooth and hard. With the supports described, and with socket screws built into the walls in positions suitably chosen, it will generally be found unnecessary to make any other attachments to the walls whatever.

In the general physical laboratory gas and water should be provided, and, if possible, a fume-closet. If the building is heated by steam, a few T-pieces, by which flexible tubing can be connected to the heating pipes, will enable steam at a pressure of 3 lbs. or 4 lbs. per square inch to be available for experiments in calorimetry and other branches of physics.

When the physical laboratory is on the ground-floor, ordinary wooden tables may be conveniently carried on brick piers, 9 in or 14 in. square, carrying stone caps only 6 in. square, which project through the floor without touching it, and form supports for the table legs. The brick piers carrying the tables should stand on foundations independent of those of the dwarf walls which carry the floor joists.

When the physical laboratory is on one of the upper floors, the table may be rendered to a certain extent independent of the floors by the contrivance adopted at the Cavendish Laboratory. Here corbels are fixed in the walls 1 ft. below the ceiling, and on these rest beams, upon which are fastened blocks, which project through the ceiling and floor to the floor-level of the room above. These blocks support the table-legs, which are thus carried from the walls of the building, but as the floors are carried from the same walls, it is obvious that the tables will not be free from vibrations which can be transmitted through a short length of wall. Tables mounted in this way are, however, immeasurably superior to tables simply resting on a wooden floor, and are sufficiently good for nearly all purposes, provided that the blocks on which the table-legs stand remain clear of the floor; but there is a great tendency for these blocks to twist and come in contact with the floor on one side, in which case the whole arrangement becomes practically worthless.

In the physical laboratory there should be at least one stone slab about 3 ft. square placed at the floor-level, but resting on a foundation of its own, so that a kathetometer or other instrument may be placed upon it and may be unaffected even by the movements of the observer himself. If it is possible to arrange trap-doors in the floors above the physical laboratory, so that wires or threads may be suspended freely from the roof of the building, such contrivances will frequently be found useful; but where this is not possible, supports should be arranged in accessible positions as high above the floor as may be, either by means of cantilevers fixed to the walls by socket-screws or otherwise, or else by beams carried across from wall to wall.

It is generally best to place the chemical laboratory on the uppermost floor, constructing it with an open roof, so as to give as much air space as possible. It is unnecessary here to enter into the details of the benches in the chemical laboratory, as full descriptions of many forms of benches have been published, notably by Mr. Robins, in his work on "Technical Schools and Colleges," which is, so far as I know, unique, and is certainly invaluable. There are, however, a few points in connexion with the fittings of the chemical laboratory to which attention may be directed, and in the first place it is desirable that the use of lead should be avoided as far as possible in the drainage of the benches. The benches themselves are best constructed about 5 ft. wide, and of length determined by the dimensions of the laboratory, but so arranged as to give not less than 3 ft. 6 in. to a junior student, and not more than 4 ft. 6 in. to a senior student. The depth of the cupboards and drawers from back to front is such as to leave a space in the centre of the bench running throughout its whole length of sufficient width for a man to pass through. This space serves to carry the gas and water pipes and the drainage trough. The

latter may be made of 1 in. or 1¼ in. red deal boards, jointed so as to form a V trough about 6 in. in depth. The trough is thoroughly caulked with a mixture of pitch and tar, put on hot, and this trough serves to collect the drainage from the sinks and deliver it into a sludge-box or small settling-tank, through an overflow on one side. The overflow from the sludge-box is delivered into a similar trough laid in a chase in the floor, which conveys it to the down-comer outside the wall. In place of V troughs, semi-circular troughs cut from the solid in red deal may be employed. These semi-circular troughs are largely used in chemical works, and avoid the joint of the V trough. For the down-comer best stoneware pipes, salt glazed, may be employed, but cast-iron pipes coated with preservative compound will last a very long time, and some experiments will probably be made shortly upon the suitability of enamelled cast-iron pipes for this purpose. Rectangular troughs have no advantage over V troughs, and only offer a much larger surface for the acid liquids to act upon. The chases in the floor, which may carry gas-pipes, water-pipes, pipes for distilled water, compressed air for the blowpipe, and vacuum for filtration purposes, in addition to the drainage troughs, should admit of being opened throughout their whole length for the purpose of inspection.

Fume-closets are generally more conveniently placed upon the walls than upon the working benches, and this arrangement simplifies the removal of the fumes without incommoding the laboratory with exhaust-pipes to the ventilating shafts. Special fume-closets should be provided in the walls for the conduct of evaporations which occupy much time, and in these closets both gas and steam should be available for heating purposes. The water-supply to the benches should be at a low pressure. Ten pounds on the square inch is more than sufficient, and ¾ in. taps are quite large enough.

In many laboratories it is necessary that the same bench should be used by two different students at different times. In such cases the bottle-racks should be sufficiently large to accomodate two sets of re-agents, and each set should be provided with a locking-bar or frame, so as to be available to only one student, who will then be solely responsible for their purity. When three or more students are obliged to use the same bench, personal responsibility for the purity of the re-agents must be sacrificed.

The balance-room is an essential appendage to the chemical laboratory, and, while readily accessible therefrom, care should be taken that it does not communicate directly therewith. The chemical laboratory and the balance-room will generally be on the first or second floor, and in that case the balances should be carried on the walls by brackets. If a separate sulphuretted hydrogen chamber is provided, it should be as far as possible from the balance-room.

A separate room should, if practicable, be set apart for gas analysis and for other operations which require the use of considerable quantities of mercury. The floor of this room should be of asphalte, in which a shallow channel of circular or other convenient form is made for the purpose of collecting any mercury which may be spilled and conveying it to an iron receptacle, whence it is collected and redistilled for future use. When mercury is spilled on a wooden floor, unless the joints are exceptionally close, a very large portion is lost and accumulates between floors and ceilings.

It will generally happen that the same lecture-room will have to be used by several departments, but it is very desirable that separate lecture-rooms should be provided for the departments of physics and chemistry, though each of these rooms may be used for lectures on any other subjects. For lectures on chemistry and physics a large amount of apparatus is frequently required, and sometimes it is desirable that the same apparatus should remain properly adjusted on the lecture table for several lectures in succession. This is notably the case with galvanometers and electrometers, some of which require much time for their adjustment. Such apparatus would not have to be disturbed in order to make provision for a lecture on a purely literary subject or one which required only the magic-lantern or diagrams for its illustration or only a comparatively small amount of lecture-table apparatus. But if the same lecture-room has to be used both for chemistry and physics a great and wasteful expenditure of labour will be incurred in removing the apparatus after each lecture.

The engineering laboratory and the principal workshops must be on the ground, and, when land is available, they are best placed in a one-story building, with a "ridge and furrow" roof, separate from the main building, but communicating directly with it. When it is necessary to place the engineering laboratory and workshops on the ground floor of the principal building, the floor above should be of concrete, and the principal shafting should be carried on A frames, or other supports independent of the structure of the building.

The engineers' drawing office should be readily accessible from the workshops, so that the superintendent of the department may be easily able to supervise both, as it will not generally be possible, or even desirable, to employ separate staffs of teachers for the drawing office and workshops, though in commercial works the drawing office staff is clearly differentiated from the shop foremen and managers.

The biological department may with advantage be located on the highest floor, so as to command the best possible light and ventilation. A good range of windows on the north side coming within 3 ft. of the ground is, perhaps, the chief desideratum in a biological laboratory. Sinks, a good water-supply, and tables which are strong enough not to yield to the pressure of the hand, because perfect steadiness is required for microscope work, with gas connexions for table-lamps on every table, are also important desiderata.

The uppermost story is also specially fitted to meet the requirements of the department of fine art, but of these requirements it is unnecessary for me to speak, inasmuch as every architect is necessarily thoroughly conversant with them. I will only point out that an open Mansard roof constructed with steel principals, which are stiffened by gusset stays so as to avoid the necessity for tie-bars, which might throw a shadow on a cart, seem most suitable for roof construction in this department.

Lastly, with regard to the general arrangements of the building:—

A corridor of ample width should be carried on the ground floor throughout the whole length of the building, but in many cases through corridors will not be necessary on all the floors, provided that there are sufficient staircases to allow ready access to each department. It is difficult to carry corridors through a building on every floor without interfering with the access of light to the rooms, and in order to permit of the lighting of the rooms from both sides it is sometimes worth while to dispense with the through communication. In the College at Newcastle the first and second floor corridors extend for only one-quarter of the length of the building, so that the chemical laboratory and adjoining rooms, the physical lecture theatre, the apparatus rooms, the first-floor physical laboratory, and the optical laboratory occupy the whole width of the building, while the through corridor on the ground floor is built like the side aisle of a church as an annexe to the main building, but the roof being a lead flat and the corridor only 9 ft. high, while the ground-floor rooms are 16 ft. 6 in. high, it has been possible to construct windows above the roof of the corridor to afford a cross light to the ground-floor rooms.

Where steam power is required in the workshops or laboratories, it is most economical to employ low-pressure steam for the heating of the building, and to adopt engines which admit of efficient working with a back pressure of four or five pounds per square inch on the exhaust, so as to enable the heating-pipes of the building to be employed as a surface condenser. If the building is lighted by electricity, the utilisation of the exhaust steam becomes an important consideration, as when the whole of the building is lighted, the exhaust steam from the electric light engines is about sufficient for the heating on a very cold day. For example, a room of a floor area of 1,200 square ft., and 16 ft. in height, may be very brilliantly lighted with high efficiency lamps, by the expenditure of two electrical horse-power. To develop this amount of power by non-condensing engines of twenty or thirty horse-power, and of moderate efficiency, will require about 75 lbs. of steam per hour. A much greater efficiency may, of course, be obtained with larger engines, or with high-speed engines coupled directly to the dynamos, and specially constructed for electric lighting. Now, 75 lbs. of exhaust steam in condensing and cooling in the pipes will give about 40,000 pound-centigrade units of heat, and this will raise about 10,000 lbs. of air through 16 deg. C. This quantity of air is equivalent to 130,000 cubic feet, and the capacity of the room being only 19,200 cubic feet, the air might be changed about seven times in an hour, which is more than twice the frequency required for class purposes. The ordinary allowance of electric light is one 60-watt lamp for 64 square feet of floor, reducing the quantity of steam for the room mentioned to rather less than 60 lbs. per hour. As the corridors and some other parts of the building do not require to be illuminated as brilliantly as the class-rooms, and as the ventilation will be continued in many of the rooms when the lights are not burning, it will be found that if boilers are laid down for the supply of the electric lighting engines they will suffice and not be much too large for the heating of the building in cold weather. When the engines are not running, the heating coils will, of course, be supplied directly from the boilers through a reducing value.

If it is necessary that any section of the building should be heated by a low pressure hot water system, and if steam boilers are provided for the electric lighting and steam heating of the remainder of the building, it seems undesirable that a special boiler fire should be kept up for the one section, especially if that section of the building to be heated by hot water is remote from the boiler-room. In this case the hot water circulation may be maintained by a coil of steam-pipe carried through a tank to which the hot water circulating pipes are connected, the tank being placed, like a circulating boiler, at the lowest level available, and the steam supplied from the main boilers and drained back to the hot well.

For the conduct of steam-pipes, return hot-water pipes, gas-pipes, cold-water pipes, electrical conductors, and, with some systems of ventilation, of the exhaust air-shaft, it is desirable that a subway, or basement corridor, should be constructed throughout the length of the building. From this corridor access may be obtained to the space beneath the floors of all ground-floor rooms whose floors are boarded in the ordinary way.

The question of ventilation has already been alluded to in relation to the heating, as the two subjects are inseparably connected. It has been pointed out by Professor O. J. Lodge, and it is a matter of common experience, that when the air is warmer than the walls or other objects in the room there is a tendency for the dust in the air to be deposited on the colder surfaces, and this is generally associated with an unpleasant feeling of "stuffiness." Hence heating by heated air is a dirty method unless steps are taken to cleanse the air before it enters the rooms. This may be done to some extent by causing it to pass through a sheet of water produced by a "spreader," but the method is somewhat expensive. Any attempt at filtering the air through wool or other material introduces an amount of resistance to the current which is practically fatal. On the other hand, if the incoming air is cold, and the room heated only by radiation from the steam-pipes, it is very difficult to avoid currents of cold air, with the practical certainty that the inlets will be closed by the persons occupying the rooms. A compromise between the two methods leads in some cases to satisfactory results. By boxing-in one-half of the steam-pipes with wooden casing, and allowing air to enter through the walls beneath the windows, and to pass over the hot pipes, and thence diffuse through the room, the whole of the entering air may be suitably warmed, while one-half of the steam-pipes remains for the heating of the walls and furniture by radiation.

If radiators, instead of steam-pipes, are used in the best rooms, care should be taken in selecting the type of radiator to see that the castings, if such be employed, are so designed that it is impossible for unequal heating to cause strains of such a nature as to produce fracture of the casting. If two terminals are connected by three or more tubes forming one casting, it is possible to arrange such a distribution of temperature as to necessitate the fracture of at least one of the tubes. If the castings are held together by light wrought-iron ties which are external to the steam-tubes, so that their temperature is raised very slowly, the ties are liable to be strained beyond their elastic limits during the rapid heating of the castings, and to require frequent screwing-up in

order to keep the radiators steam-tight. There are types of radiators in the market which avoid all these difficulties.

With regard to the removal of the exhaust-air, there is little doubt that mechanical ventilation is most effective, and air-propellers of the Blackman type, driven by a gas-engine or electric motor, have proved very successful, even when the air has had to be drawn through a couple of hundred feet of tubes. The propeller may be inserted in a wall at the top of the principal staircase, or in some other convenient position, and the corridors may be used as air-ways, the air entering the rooms as above described, and passing through the opposite walls into the corridor. The system, perhaps, offers the least resistance to the air-currents, and a large propeller driven at a comparatively slow speed will do its work without noise or vibration. An electric motor may be directly coupled with the fan, whatever its position, or the fan may, itself, be wound as a motor, but if a gas-engine is employed, the power should be transmitted by a belt outside the building. It is clear, however, that the chemical laboratory, or any other rooms in which noxious fumes are produced, must be cut off from this general system of ventilation, and be treated specially. If it can be arranged to erect the boiler-chimney-shaft within a few feet of the chemical laboratory, the exhaust from the fume-closets, as well as the general ventilation of the laboratory, may be carried into the shaft, at the cost of somewhat reducing the steaming power of the boilers. It is very undesirable that any attempt should be made to carry the whole exhaust from the building into the boiler-shaft. If the chimney-shaft is not available for the chemical laboratory, it is best to provide a special fan for the exhaust of the fume closets and the laboratory generally, conducting the air to the fan along a system of carefully-constructed tubes. In small laboratories the general ventilation may be effected by ventilators in the roof, and the exhaust of the fume closets may be carried out by ordinary chimney-flues, in which an upward current is maintained by a gas-burner; but when it can be employed the fan gives by much the best results.

It should always be borne in mind that any system of air conduits will serve also as tubes for the transmission of sound, so that rooms, like workshops, in which noisy operations are carried on, should be provided with separate ventilation. It must also be noticed that when a fan is driven at sufficient speed to exhaust through a great length of narrow tubes, it will necessarily be noisy, and the sound will be carried to every room which communicates with the ventilating system.

Where rooms of different capacity communicate through independent tubes of different lengths, with the same exhaust chamber, the diameter of the tubes should be proportional to the fifth root of the square of the quantity of air to be removed per hour, and to the fifth root of the length of the tube.

The great expense incident to efficient ventilation lies in the heat required to raise the temperature of the entering air in very cold weather. For example, suppose a building to contain 1,000,000 cubic feet of air, and this is to be renewed only once an hour on the average of the whole building, and that the entering air must be heated through 27 deg. F., or 15 deg. C. The weight of 1,000,000 cubic feet of air will be about 77,000 lbs., and its specific heat being ·24, the number of heat units required to raise this quantity of air through 15 deg. C. is 277,200 lbs.,—centigrade units. This will involve the condensation of 504 lbs. of dry steam, and the combustion of about 60 lbs. of coal; but this allows nothing for the cooling of the air within the building, which in a brick or stone building takes place mainly through the windows.

If we adopt the usually-accepted principle that the amount of carbon di-oxide in the air should not be allowed to exceed ·06 per cent., and that the supply of fresh air should, therefore, be at the rate of about 3,000 cubic feet per hour for each individual, and three times that amount for each ordinary gas-burner (but nothing for electric lights), we find that for 1,000 persons in a building lighted by 333 gas-burners 6,000,000 cubic feet of air per hour will be required, necessitating the combustion on a very cold day of 360 lbs. of coal per hour. If electric light were substituted, current for 333 sixteen-candle lamps would require only 120 lbs. of coal per hour for its production, but if the gas-burners are so arranged that the products of combustion escape immediately, there can be no need for the double supply of air, and if the products of combustion mix with the air they will supply more than half the heat required to warm it.

In the above sketch, arrangements have been suggested suitable for a building of considerable size, possessing, for instance, a capacity of 1,000,000 cubic feet. In the case of small schools, the same guiding principles may be adopted, though it will be impossible to attain the same degree of specialisation in the appropriation of the rooms. At the Royal Grammar School, Newcastle-upon-Tyne (Mr. R. J. Leeson, of Newcastle, architect), a stone building which had formerly been used as an elementary school became available for the departments of chemistry and physics. The principal school-room measured internally 56 ft. by 30 ft., and the infants' school-room 30 ft. by 20 ft. In addition to these rooms there was a small master's room. When a matchboard ceiling was removed there was an open roof with the ridge about 30 ft. from the floor, and a large lantern with louvres for ventilation. Skylights were inserted on the north side of the roof, and plate glass windows were substituted for the wooden frames, and small diamond panes which had previously done their best, by accumulating dust, to obstruct the light. The floor was about 2 ft. above the level of the ground outside, and there was a clear space beneath the floor about 4 ft. in height. In the large room there were two fireplaces with open chimneys, and one in the small room. The open fires were replaced by "tortoise" stoves, and the open chimney-breasts closed by sheet iron. The chimneys then served both for the stoves and for the fume-closets.

The infants' room was made to serve the double purpose of balance room and physical laboratory. Around three sides of the room an ash table was suspended from the walls on brackets similar to those previously described, while a large and heavy table, measuring 10 ft. by 5 ft., was placed in the centre of the room, and carried on brick piers, whose stone caps were finished off level with the floor. The large room was divided into two by a pitch-pine partition. The smaller portion, measuring 30 ft. by 22 ft., was fitted up as a lecture room, capable of accommodating sixty boys; the larger, measuring 34 ft. by 30 ft., was fitted as a chemical laboratory. Two benches, each 28 ft. in length, occupied the centre portion of the laboratory, and afforded accommodation for thirty-two boys working at one time, while tables were provided along the side walls to supplement the accommodation afforded by the benches. The sinks drained directly into a V trough, coated with pitch, and suspended by iron ties from the joists beneath each bench. One of the two troughs was continued under the floor of the lecture room to take the drainage from the lecture table. The two troughs discharged into a third trough, which crossed their ends at right-angles, and carried the drainage through a hole in the front wall and discharged it over an open gulley of glazed stoneware. A number of Tobin's pipes, 1 ft. square and 8 ft. in height, served for the access of fresh air.

Where the students are mostly adults, 3 ft. is a convenient height for laboratory benches and tables, and 2 ft. 9 in. or 2 ft. 10 in. in the case of school laboratories.

It is impossible in a paper of this description to enter into the arrangements which must be made in order to provide for the teaching of special local industries. Where such teaching is necessary, the first thing to be done is to acquaint oneself with the machinery and methods employed in the factories or workshops where the particular trade is practised, and then to learn precisely the extent to which these appliances should be introduced into the technical school. When spinning and weaving are taught, the technical school is to a very great extent simply a model factory or weaving-shed; but in most cases, it is the function of the technical school to provide those facilities for instruction and experimental investigation which are not to be found in the workshop; and it is comparatively seldom that the equipment of the factory requires to be reduplicated in the technical school.

In teaching purely technological subjects, the classes for which consist wholly of members of one particular trade, it is most important that the instruction should be under the general direction of a committee consisting wholly of members of that trade—masters, foremen, and operatives being all duly represented. Such a committee will do more to inspire confidence among apprentices and workmen in the practical character of the teaching than the most distinguished governing body; and there is no danger that under such direction the teaching will sink to pure empiricism if the teachers on the permanent staff of the institution are men of the right stamp.

[The paper was illustrated by working drawings and tracings of the existing and some of the proposed buildings of the Durham College of Science, prepared by Mr. R. J. Johnson and Mr. F. W. Rich, the architects, to whom the author tendered his acknowledgments.]

A brief discussion ensued as to various matters of detail, the members taking part in the discussion being Mr. Paul Waterhouse, Mr. C. H. Brodie, Mr. W. J. H. Leverton, Mr. W. H. White, and Mr. E. Sim. Professor Garnett having replied to several questions which were asked, the proceedings terminated.

THE LONDON COUNTY COUNCIL.

THE first meeting of this Council since the Christmas vacation was held on Tuesday afternoon last, the Chairman, Sir John Lubbock, presiding, but, for the reason hereafter mentioned, its sitting was a short one.

Vote of Condolence with the Royal Family—On the motion of the Chairman, a vote of condolence with the Royal Family on the death of the Duke of Clarence was agreed to unanimously, and it was further resolved to take only non-contentious business, and to adjourn early.

The London Water Question.—The Chairman announced that he had received the following important letter from the President of the Local Government Board:—

"Local Government Board, Whitehall, S.W.,
Jan. 13.

SIR,—Referring to the correspondence which has taken place between the London County Council and her Majesty's Government, I have to intimate to you for the information of the Council that her Majesty's Government have resolved to advise the appointment of a Royal Commission to inquire,—'Whether, taking into consideration the growth in the population of the metropolis, and the districts within the limits of the metropolitan water companies, and also the needs of the localities not supplied by any metropolitan company, but within the watersheds of the Thames and the Lea, the present sources of supply of these companies are adequate in quantity and quality, and, if inadequate, whether such supply as may be required can be obtained within the watersheds referred to, having due regard to the claims of the districts outside the metropolis, but within these watersheds, or will have to be obtained outside the watersheds of the Thames and the Lea.'

I remain, Sir, your obedient servant,
CHARLES T. RITCHIE.

To the Right Hon. Sir John Lubbock, Bart., M.P.,
Chairman, London County Council."

The proposal contained in the letter, said Sir John Lubbock, was substantially in accordance with the suggestion made to the Government by the Council, and he was sure that the decision of the Government must be satisfactory to them all.

The letter was ordered to be recorded on the minutes, and was referred to the Special Committee on Water Supply.

Date of the First Meeting of the New Council.—The General Purposes Committee reported as follows:—

"In our report to the Council of the 1st of December we pointed out that by the County Council Elections Act, 1891, the Council may fix the day and hour for the statutory meeting at which the Chairman and Aldermen of the new Council are to be elected.* Having considered the matter, we have come to the conclusion that Tuesday, the 15th day of March, will be the earliest convenient day for the meeting. We recommend:—

'That Tuesday, the 15th day of March next, at 3 o'clock, be fixed as the day and hour for the statutory meeting at which the Chairman and Aldermen of the new Council are to be elected.'"

This was unanimously agreed to.

Tenders: Return of Deposits of Money.—The General Purposes Committee's Report also con-

* As we have already announced, the date of the election of the new Council itself has been fixed to take place on Saturday, March 5.

tained the following paragraph and recommendation, which were agreed to:—

"The Main Drainage Committee has represented to us that it would be desirable that some general order should be made with reference to the return of the deposits of money made by persons applying for specifications and drawings of an advertised work. In many cases the money deposited is returned to persons who subsequently send in *bonâ-fide* tenders, but in some case of large works, in connection with which great expense has been incurred in the preparation of drawings, it has been the practice to retain the amounts deposited. We think that this variation in practice should not continue, and that in all cases money so deposited should be returned to persons who send in *bonâ-fide* tenders. We accordingly recommend—

'That the following be a standing order of the Council,—The money deposited with the Council by persons who apply for specifications and drawings of an advertised work shall afterwards be returned to those who shall have sent in *bonâ-fide* tenders.'"

Emanuel Hospital, Westminster.—The Corporate Property, Charities, and Endowments Committee presented the following report on the proposed removal of this building:—

"This foundation has recently been the subject of a special inquiry held by Mr. Clabon, on behalf of the Attorney-General, with a view to ascertain the wishes of the inhabitants on the question which has been raised whether the site of the hospital should or should not be sold; and, at our request, a gentleman from the Solicitor's department attended the inquiry to watch the proceedings on behalf of the ratepayers.

The charity was founded in the time of Queen Elizabeth, and the hospital buildings erected shortly after its foundation are still standing, and are still used as almshouses. It appears, however, that the income of the endowment has largely fallen off, and is not likely to recover itself. The present annual income of 620*l.* is all that is applicable to the hospital (as distinguished from the schools, with which we do not now concern ourselves), and this is found insufficient to carry on the work of the charity; several of the rooms are in consequence unoccupied, and the property is in a state of dilapidation. The site, however, is situate in close proximity to Victoria-street, and is now a very valuable one, and if it were sold a large sum might be expected to be applicable, either for the establishment of the hospital elsewhere, or for some alternative scheme.

We are of opinion that the site of the hospital should be sold, and that the proceeds should be devoted to out-pensions for the aged instead of the hospital being erected elsewhere. We think that the views of the Council should be submitted to Mr. Clabon, with a view to his transmitting them with his report to the Attorney-General, and he has indicated his willingness to do this.

We therefore recommend:—

'That the Council do approve of the proposal to sell the site of the hospital, and that the Clerk be instructed to inform the Attorney-General (through Mr. Clabon) and the Charity Commissioners to that effect, and also to intimate that in the opinion of the Council the proceeds of such sale should be devoted to out-pensions for the aged instead of re-erecting the hospital elsewhere.'".

On the motion that this recommendation be agreed to, Mr. Acworth said he should oppose the proposal strongly, as its adoption would have the effect, without doubt, of covering what was now for a great part virtually an open-space, surrounded by low buildings, with lofty blocks of flats or other buildings.

As the recommendation was thus opposed, its consideration stood adjourned.

After transacting some other business, the Council adjourned at 10 minutes to 4 o'clock.

DECORATIVE WORK.—In the little R.C. Church of St. Joseph, at Christchurch, in Hampshire, two designs, executed in the "Corvo Arras" method, were unveiled for the first time on Christmas Day. The panels (each 100 in. by 34 in.) are adapted to their position on either side of the chancel arch, with lines that harmonise with the building. The subject is the Annunciation. A ray of light crosses from the upper left-hand corner of one to the lower right-hand corner of the other. In this ray, on the left panel, the Archangel Gabriel is kneeling, in a dalmatica of primrose hue with apparels and orphreys of blue embroidered on silver. He bears a lily sceptre set with sapphires. On the other panel, the Virgin sits on a throne. On the footstool beneath her feet is brocaded the dragon crushed and dead. Behind her, bearing aloft a crown of fleur de lys above her head, the Archangels Michael and Raphael float in the air. The whole design is encrusted with gems, and silver, and gold, like the initials of an antique missal.

LIVERPOOL ENGINEERING SOCIETY.—The sixth ordinary meeting of the present session was held at the Royal Institution, on Wednesday evening, January 13, Mr. F. Hudleston, Assoc.M.Inst.C.E., occupying the chair. Mr. A. J. Maginnis, M.Inst.N.A., read a paper entitled 'Transatlantic Lines and Steamships, No. 2."

Correspondence.

To the Editor of THE BUILDER.

THE NEW BUILDING BY-LAWS FOR LONDON.

SIR,—It would be well that the new By-laws should be carefully read by everyone who has to do with building works in the county of London. It sometimes seems as if some people do not read their *Builder*, as they should properly, from first page to last every week, and people of that sort may remain ignorant of the new things in the By-laws for a long time, and give to themselves and to others very much trouble in consequence.

I would suggest that the London County Council should make a special effort to bring the By-laws well under people's attention. A letter might be sent, pointing out the novelties, copies of the By-laws being enclosed with the letter. If every architect, surveyor, house agent, master bricklayer, carpenter, and plasterer in London was reached in that way, a good beginning would be made. The expenditure would be very small, and the saving to the community, probably, a thousandfold at least.

Contractors should supply foremen, subcontractors, &c., with copies of the By-laws. The R.I.B.A. might lay in a small store, and supply copies to members at, say, a shilling for twelve, for distribution to clerks of works, hanging-up in offices, &c.

A DISTRICT SURVEYOR.

FLOORING-BOARDS ON CONCRETE.

SIR,—In some workmen's dwellings, I am anxious to lay ordinary deal flooring tongued, directly on concrete, composed of coke breeze and Portland cement, to which the flooring would be nailed.

Will any of your readers kindly state their experience of floors so laid? Are the boards liable to "cockle" or to decay more rapidly than if laid on joists? If they are, what is the best means of getting over these objections? Block flooring would be too expensive. SURVEYOR.

11, *Leinster-street, Dublin.*

BOLSOVER COLLIERY COMPETITION.

SIR,—I wrote for the particulars of the above competition, and duly received a copy of the same from a Mr. Houfton.

It may interest your readers to know that, on perusing the requirements, I found that a sum of 40*l.* was offered for the best set of plans for seven private houses, schools for 600 children, a workmen's club, a hospital, and a co-operative stores.

I need hardly say that I returned Mr. Houfton his particulars, and at the same time expressed a hope that no one in the profession would find it worth while to undertake this exceptional amount and charming variety of work, for the ridiculous sum offered as first prize by the Bolsover Colliery Company. H. G.

The Student's Column.

WARMING BUILDINGS BY HOT WATER.

IV.

DISPOSITION OF PIPES IN AND NEAR BOILER.

IT will be found that in describing different phenomena, reference may be made more often to horticultural than to building works. The reason for this is that minor points and features of no great moment do not need the consideration in the latter that they do in the former undertakings, with the low power of circulation that is the prominent feature; consequently, unless the question touched upon is of some importance, it may probably be spoken of as applying to horticultural works only. Of course, all methods and works will be treated as fully as possible; but the two descriptions of works now being spoken of cannot well be treated together, on account of the vast difference the speed of circulation in each makes. In speaking of air dislodgment, and some appliances, &c., the two subjects need no separation, but otherwise than this, they will be dealt with distinctly, and horticultural works had better be taken first.

The preceding papers have shown the necessity of terminating the two different services,—that is, the flow and the return,—at different levels in the boiler: the flow the highest, and acting as an outlet for the heated water; the return at the lowest point, being an inlet for the cold or cooler water. The most desirable point for the flow-pipe to be connected is at the crown of the boiler, the very highest point on the top, this being conducive to the free and unimpeded escape of the outgoing water, and also permitting of the free exit of air. Fig. 7 shows in front elevation the flow-pipe situated upon the apex of a saddle-boiler,—its correct position.

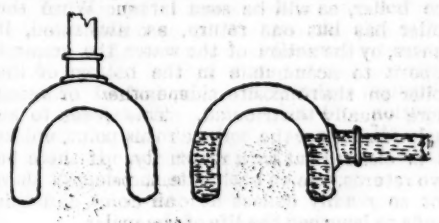

FIG. 7. FIG. 8.

If we carried the flow-pipe from the side of a boiler, the fact of its starting in a horizontal direction would not suffice to destroy the circulation (provided the return-pipe entered at a still lower point, and other features were correct), but it would leave no means for the air to escape from the upper part of the boiler, as fig. 8. This would cause not only inefficient results, but the destruction of the boiler by the action of the fire on the unprotected boiler-plate. The inflow of water when the apparatus was charged would not expel the air, as might possibly be supposed; and even if it did, there is the perpetual absorption and expulsion of air by water, in the cooling and heating processes, to be guarded against. When the flow-pipe starts from the side of a boiler, as is most usually the case with small boilers, and also with the Loughborough pattern boiler, it has of necessity to be taken from the extreme highest point to avoid this trouble. A collection of air at any point in an apparatus will nearly always ruin its efficiency.

If there were two or more flow-pipes proceeding from a boiler, as is usually the case with the larger sizes, it would not matter if any were connected at lower points, provided one started from the top. One pipe would quite overcome the air-collection difficulty, but it is better for general purposes to take all flow-pipes from the top if anyway possible, more especially in large works. However favourable general conditions may be to an effective circulation, it is not well to do anything opposed to efficiency if it can be avoided.

In ordering boilers, the desired number, sizes, and positions of the pipe connexions are usually indicated, and so furnished and fitted by the maker. In this case no fear need be experienced of the connexions being wrongly made; and, as a rule, the fittings for connecting cast-iron pipes to boilers cannot very well be wrongly attached. If, however, it is proposed to use wrought-iron pipes, as is nearly always the case in building works, the most the maker generally does, unless otherwise instructed, is to drill and tap (screw) holes in the boiler of a suitable size for the pipe in question. If this be so, there is the possibility of the fitter screwing his flow-pipes right through the substance of the boiler, so that it projects inside.

If this projection occurs, it becomes impossible to fill the boiler quite full, as the water cannot rise above the end of this pipe, as fig. 9. This would be rather evidence of bad work than otherwise, and if there be the least likelihood of its occurring, it is better to have a flange affixed for the flow-pipe to be connected into. With a flange we may screw the pipe in about ¾ in. without causing the trouble referred to.

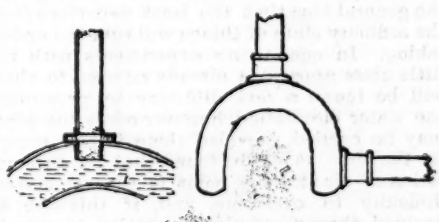

FIG. 9 FIG 10

With the return-pipe we have practically none of the details to consider that are so important with the flow. The chief point is to give it the lowest possible position, and, when convenient, as far removed from the flow as possible. The return can rarely ever be brought vertically into the boiler, as the pre-

sent forms of boilers, almost without exception, necessitate its entering at the side. With the saddle-boiler it would enter as fig. 10, but where circumstances and the size of the apparatus are favourable, it is a good plan to have a return entering on each side (there are commonly two returns and one flow connected to the boiler, as will be seen later). When the boiler has but one return, as illustrated, it causes, by the action of the water, the greatest deposit to accumulate in the bottom of the boiler on the opposite side, instead of being more equally distributed. This leads to an early fracture of the boiler at this point, unless it is cleaned out with regularity. If there be two returns, one on each side, the deposit does not so readily collect at one point, and this tends to lengthen the life of the boiler.

There is no question of air dispersion, or of freedom in the action of convection currents, to be considered in the connexion of the return pipe to the boiler. It is sufficient that it should be properly connected, and cause no obstruction to the regular passage of water through it.

It is usual when carrying out these works to arrange for the flow-pipe or pipes to be carried above the returns; that is, the two pipes are run one above the other, the flow uppermost, and the return beneath. This applies whether there be but two pipes or a number, and it also applies whether the pipes be mains or branch services. The regularity of this practice induces many people to think that the arrangement is necessary to effect the proper circulation of the water. This, however, is not the case,—it is merely a practice, and nothing more, but, of course, it is based upon getting the best results, and being a method that prevents doubt and confusion when erecting new or re-arranging old works.

If it would prove a convenience there is not the slightest objection to carrying the flow and return side by side, and this is usually done when two pipes are run in a channel (with grating over), this arrangement permitting of the channel being shallow, and both pipes are effective in distributing heat. They would not be so effective if one pipe was below the other in a trench, as the lower would be interfered with by the confinement. If, also, it ever became necessary to reverse the usual position of the pipes, and carry the flow beneath the return, it would not destroy efficiency, provided the connexions at the boiler were correct; as fig. 11 for instance. The customary arrangement is as fig. 12.

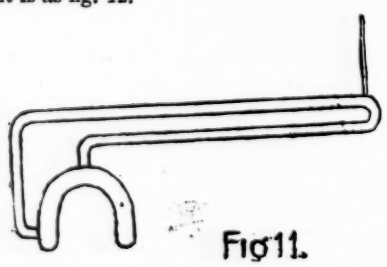

Fig 11.

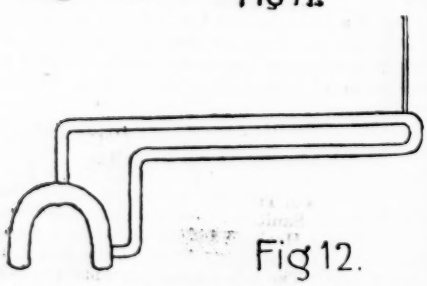

Fig 12.

The object in showing this is to do away with the general idea that the least departure from the ordinary state of things will ruin the undertaking. In conducting experiments with the little glass apparatus already referred to, there will be found a real difficulty in preventing the water circulating, however oddly the pipes may be carried, provided there is free escape for the air. It will be found that an accumulation of air at some point is the commonest difficulty to overcome, and, if this can be avoided, then a circulatory motion is sure to set up in the water. In experimenting with unusual arrangements of the pipes, the chief difficulties, after the air question is settled, will be the liability of a reversed circulation, or perhaps a circulation in the right direction, but too sluggish to be of service if the works be extensive. As a rule, however, for ordinary requirements, it can be arranged for the pipes to be carried according to the usual method.

OBITUARY.

MR. ALFRED PORTER, F.R.I.B.A.—We regret to hear of the death, on the 14th inst., of Mr. Alfred Porter, F.R.I.B.A., aged fifty-five. He became an Associate of the Institute in 1856, and a Fellow in 1860.

MR. THOMAS MORGAN, F.S.A., died on the 13th inst. at his residence, Hillside-house, Streatham, Surrey, at the age of seventy-two. For a considerable time he was a Vice-president of the British Archæological Association, and for fifteen years was their honorary treasurer. During his connexion with the Association he contributed, as the *Times* says, "many scholarly and learned papers, chiefly relating to his favourite subject, Roman archæology. In 1886 he published his 'Romano-British Mosaic Pavements,' which contained a history of their discovery and a record and interpretation of their designs, and which is now a standard work on the subject. Up to a few days before his death he was busily engaged completing another work on a kindred subject." All who knew him and had accompanied him on archæological excursions will remember his amiability and the ardour with which he entered into his favourite pursuit.

GENERAL BUILDING NEWS.

NORWICH CATHEDRAL.—The Dean of Norwich, preaching in the cathedral on Sunday morning, the 10th inst., gave notice that on and after Monday, the 11th, all the services would be held in the nave, the reason being the restoration of the three great columns, which, with the fourth, recently repaired, support the tower. The three columns, now at last to be dealt with, have been in a state of dilapidation for some fifty years, if not more. From inquiries which have been made (says the *Norfolk Chronicle*), it is encouraging to learn that the stone to be used in the work is already cut. A large staff of masons have been busily engaged, under the direction of the cathedral architect, and this portion of the cathedral restoration will proceed as rapidly as is consistent with security, and with due regard to the preservation of that regularity which so strongly characterises Norman work. The Ethelbert-gate is now complete. This structure has been restored under the direction of Mr. Ewan Christian. The restoration of the cathedral is to be reported upon by Mr. Pearson.

NEW CHURCH AT SHALDON, TEIGNMOUTH.—The river Teign divides Teignmouth and the pretty villages of Shaldon and Ringmore, the latter place having one of the most interesting and complete little thirteenth-century churches that the large county of Devon can boast of, with an east window that commands the admiration of all who see it. It has been found necessary to build a separate church for the larger place, Shaldon, for which Mr. Edmund Sedding, of Plymouth, has been asked to prepare plans.

YORK CITY AND COUNTY BANK, LEEDS.—New premises for the York City and County Bank are now being erected at the junction of Park-row and Bond-street, Leeds. The exterior of the building is being carried out in Bradford stone. The ground-floor is treated externally with rusticated quoined courses, the windows being circular-headed, and the entrance to the bank is placed at the angle of the building, the frieze and pediment being carried by polished red granite columns. Extending upwards over the height of the first and second floors are eight pairs of coupled Corinthian columns, and the whole is crowned by an elaborate frieze and cornice. The interior arrangements will, according to the *Leeds Mercury*, both in design and finish and completeness of equipment, be carried out in a style consistent with the external appearance of the building. The basement contains porter's house, strong-rooms, heating and dynamo rooms. On the ground-floor, and facing Park-row, is the bank-room, lighted at the back by a lantern light, and opening out of the public-room are the manager's and waiting rooms, strong-room, &c. The walls of the bank will be lined internally with Burmantofts faïence. All the counters, desks, &c., will be in half-polished oak, having brass fittings of special design. There will be a fine suite of offices on the ground floor, with separate entrance from Park-row. The first and second floors, which will be entered from Bond-street, will also be fitted up as offices, having strong-rooms on each floor. The works are being carried out by Messrs. W. Nicholson & Son, of Hunslet, from the designs and under the superintendence of Messrs. Smith & Tweedale, architects, Leeds. Mr. Appleyard, of Leeds, has been entrusted with the execution of the carved work.

HOSPITAL FOR INFECTIOUS DISEASES, BRENTFORD.—The new hospital erected by the Brentford Local Board for the reception and treatment of cases of infectious diseases was opened on the 14th inst. The building has been constructed by Messrs. Allen Sons, of Kilburn, from plans by Mr. J. H. Strachan, the Surveyor to the Board. It has aspects to the west and east, and is built on a piece of land contiguous to the Board's sewage works in the Ealing-road. It has a main approach from Clayponds-lane, in addition to one from the Brentford sewage works. In shape it is oblong, with a wing at either end, and it consists of one story throughout, raised 8 ft. on concrete to the level of the road. It is built of stock bricks, with facings of Lawrence's red bricks. Its extreme length is 125 ft., and the widest part, exclusive of the wards, is 20 ft. across. The basement will be used only as cellarage. Forty-eight feet away from the main building, and adjoining the main entrance in Clayponds-lane, is situated the administrative cottage, containing a sitting-room, kitchen, surgery, four bedrooms for the use of the nurses, and a bath-room, all spacious and conveniently adapted for the purposes for which they are required. In another direction, 40 ft. away from the main building and 40 ft. from the nearest fence, is the mortuary, laundry, and disinfecting house, each of which is fitted with its necessary furniture. The hospital itself is 80 ft. from Clayponds-lane, and 55 ft. from the boundary fence of the sewage works. The wings are occupied solely as wards, and their dimensions are 36 ft. by 18 ft., and 13 ft. high, the latter figure representing the height of all the rooms in the building. The smaller wards measure 24 ft. by 18 ft. by 13 ft. high; and the two nurses' duty rooms, which adjoin the wards, are 16 ft. by 14 ft. by 13 ft. high. The whole of the interior walls have been finished in Parian cement, painted and varnished to a high gloss. All the interior and exterior angles in the wards and nurses' duty rooms have been rounded, and the skirting and cornices have been designed with a view of preventing the harbouring of germs, &c. Attached to each ward are verandahs fitted with necessary conveniences for the use of the patients who become convalescent. The building is constructed for the accommodation of ten cases of an infectious nature only at a time, and it is designed so as to permit of the admission of two kinds of diseases, and further, the wards are so arranged that a person cannot get from one block to another without having to walk a distance in the open air of 56 yds. The sanitary arrangements are of the ordinary kind, and lighting is by means of gas brackets. The heating is by fireplaces, which also act as ventilators, "hit and miss" ventilators being inserted in the skirting, and the windows having fanlights opening in the wards near the ceiling, so arranged that a through current of air is ensured in each ward. The contract price for the erection of the building was 3,630*l.*, and it was stated by Mr. Strachan during the proceedings that the building had been erected absolutely without "extras."

NEW BUILDINGS IN BIRMINGHAM.—Mr. F. W. Lloyd, the City Buildings Surveyor of Birmingham, has supplied us with a return of new buildings, &c., for which plans were approved during the year 1891, together with a summary of the three previous years. The total for 1891 was 1,541, as compared with 1,708 in 1890, 1,530 in 1889, and 2,587 in 1888. About 1,000 houses are erected each year in the city. During the year 645 notices were forwarded to property owners and others as to dangerous buildings, projecting signs, emblems, &c., and a quantity of land, amounting to 176½ yds. super, has been conceded to the Corporation by owners of property setting back projecting windows, steps, &c.

NEW SWEDENBORGIAN CHURCH, SALFORD.—A new Swedenborgian church was formally dedicated on the 15th inst. It is situate at the corner of Walness and Lower Broughton-road. The new structure is of Gothic design, and has been erected by Mr. J. Ramsbottom from designs by Mr. Thomas Browne, architect, Manchester, at a cost of 4,300*l.* The church consists of chancel, minister's and choir vestries, and a ladies' retiring-room. There is also a school-room under the church, giving accommodation for 350 scholars. The church will seat about 300 worshippers. It has been built to replace the church known as "The Temple," the site of which was recently acquired by the Lancashire and Yorkshire Railway Company.

NEW BANKING PREMISES AT ADLINGTON, LANCASHIRE.—On Monday last new premises for Messrs. Williams Deacon & Co. and the Manchester and Salford Bank were opened for business. The new building, which occupies a prominent corner site in Church-street, have been erected from the designs of Messrs. Jolly & Buckley, architects, Chorley. It is constructed of Yorkshire stone parpoints, with polished stone dressings. The style is Classic. The contractors were: Excavator and masons' work, Mr. W. Fairclough; carpenter and joiners' work, Mr. Robert Brownley; slater, plasterer, and flagger, Mr. W. Hampson; plumber, glazier, and painter, Mr. T. Sharples. The work has been carried out at a cost of about 2,500*l.*

LOCAL BOARD OFFICES, FELIXSTOWE.—The foundation-stone of the new offices for the Felixstowe Local Board was laid on the 14th inst. The site was given to the Board by Captain E. G. Pretyman. The new offices will front Undercliff-road at a point just beyond the road leading up to the cliff near the Convalescent Home. The new building, which is to be "Early English" in character (according to the *Suffolk Chronicle*), will occupy a frontage of some 62 ft. to Undercliff-road, its extreme depth being 32 ft., and its mean depth about 26 ft. This will still leave room for the erection of a further building 40 ft. by 25 ft., should it be thought desirable to add to the offices at some future time a reading-room and library, or, as the population increases, a building to which the name of Town Hall might be given. The front elevation

will be of plain red brick on a plinth of blue bricks, with tiled roof, relieved by a gable at the east end. The architect is Mr. G. S. Horton, the Board's Surveyor, and the contract, for 1,670*l.* has been entered into by Mr. H. Runnacles, Halstead.

NEW CHURCH AT STAINES.—The Solicitor-General and Lady Clarke have generously undertaken the cost of a new church at Staines, at a cost of not less than 5,000*l.* A site has been secured facing the river, and the building is to be designed by Mr. G. H. Fellowes Prynne, whose fine church at West Dulwich, which we illustrated in the *Builder* October 18, 1890, has attracted so much admiration.

SANITARY AND ENGINEERING NEWS.

SEWERAGE WORKS, &C., AT ACCRINGTON.—On the 14th inst. a Local Government inquiry was held at Accrington, by Colonel W. M. Ducat, R.E., into an application made by the Council for the borrowing of 12,740*l.* for works of sewerage, street improvement, public lighting, and the erection of stables. The Town Clerk said the first item on the application was for the improvement of Willows-lane, for which they asked 1,610*l.*, and for sewering to same 1,000*l.* The period for which they asked the loan, as under the Public Health Act, was for a term not exceeding sixty years. In regard to the Dyke Nook sewerage scheme, the Town Clerk said this was to prevent the pollution of the Altham stream, which ran through the borough from the adjoining township of Altham, within the Rural Sanitary District of the Burnley Union, and from that authority they had received now, for a period extending over four or five years, written intimations that unless they took their sewerage out of the stream they would take proceedings against them. The amount asked for under that head was 4,913*l.* For the sewering of Burnley-road the Council asked 1,494*l.* For part of this district there was practically no system of sewerage. The cost of similar work in Whalley-road and adjacent streets was included under the head of the Dyke Nook schemes. For the Corporation stables they asked for the "extras," which, on an estimate of 15,000*l.*, only amounted to 180*l.* The last item of the application was for 2,022*l.* for street lamps and their erection. The town was rapidly increasing, and that sum would provide them with lamps for eight or ten years. The Inspector subsequently visited the various places referred to in the application.

CASTLE DONINGTON SEWERAGE.—The Shardlow Rural Sanitary Authority have applied to the Local Government Board for a loan of 4,000*l.* for the sewerage and sewage disposal of Castle Donington. The sewage will be purified by irrigation on land. Mr. W. H. Radford is the engineer.

SEWAGE PURIFICATION AT BIRKDALE. — Major-General C. Phipps Carey, R.E., of the Local Government Board, recently held a public inquiry at the Town-hall, Birkdale, about the disposal of the Birkdale sewage. The lime treatment of the sewage having produced bad results, the Southport Corporation obtained an injunction against the Birkdale Local Board for polluting a brook. To remove this injunction, the Birkdale Board proposed to continue treating their sewage with lime, but carrying their effluent therefrom through a pipe-sewer into the sea. This was opposed by the Corporation of Southport and by neighbouring landowners. Dr. E. Frankland, F.R.S., of the Rivers Pollution Commission, and Mr. Mansergh, M.Inst.C.E., gave evidence for the Southport Corporation against lime treatment of the sewage. These eminent authorities recommended the Ferozone and Polarite process of the International Company, as in their opinion it would produce the most satisfactory results, and would be less costly than the method proposed. After hearing this evidence, the representatives of the Birkdale Local Board withdrew, and, after a short deliberation, announced their willingness to give an undertaking to adopt the international process, whereupon the opposition of the Southport Corporation and the other opponents was withdrawn. The Birkdale Board have accordingly instructed Mr. Charles H. Beloe, M.Inst.C.E., of Liverpool, the Consulting Engineer to the International Water and Sewage Purification Company, Westminster, to prepare the scheme in conjunction with Mr. J. H. Fairbairn, the Surveyor to the Board.

UNIVERSITY EXTENSION LECTURES.—The following are the remaining lectures of the course which are being delivered by Mr. T. Locke Worthington at Hampton Court, before alluded to in our columns:—January 15, "Basilican Romanesque," "Diocletian Romanesque," "Primitive Romanesque" (so-called), "Mature Romanesque" (so-called); January 22, "The Primitive and Mature Romanesque of England"; January 29, "The Periods of Pointed Gothic in England"; February 5, "The Later Periods of Pure Gothic in England"; February 12, "The Movement and Styles of the Renaissance"; February 19, "Modern Architecture in London," "New Style of Architecture and Modern Developments." The above course, reduced to ten lectures, will be repeated at Finchley and at Sutton (Surrey).

FOREIGN AND COLONIAL.

FRANCE.—M. Bonnat has been elected President of the Société des Artistes Français, in place of M. Bailly, and M. Dutert has succeeded M. Bailly as member of the Conseil Supérieur of the Ecole des Beaux-Arts.——The Champ-de-Mars Salon is to open on May 7.——M. Edouard Garnier has been appointed Conservateur of the ceramic museum at Sèvres, in place of M. Baumgart.——The architectural department under the Municipality of Paris has prepared plans for the restoration of the tower of the Ducs de Bourgogne, known as the "Tour Jean Sans Peur."——The Municipal Council has under consideration a proposal to erect statues of Racine and Corneille in the Place du Théâtre Français.——The impressionist painters have made a curious attempt at practical architecture; a house is being built in the Quartier des Invalides, from the designs of M. Besnard, the painter. The decorative paintings are being executed by M. Luce, and the sculpture by MM. Berthet and Léon Gausson.——M. François Lafon is to execute, for the foyer of the Théâtre du Chatelet, two decorative panels symbolising "Dancing" and "Music"; these are to replace the portraits of Napoléon III. and the Empress Eugénie which formerly decorated the two fireplaces of the foyer.——There is to be an art exhibition at Amiens from June 5 to July 14.——At Châtillon-sur-Loire there have just been discovered the remains of three aqueducts, in the course of the works for the formation of a canal. The largest of these is not less than 1,500 mètres in length. Knives, pottery, and ancient arms have been found during the excavations. As a statue of Venus and some Gallo-Roman coins were found in the same place some years ago, it is supposed that there was an important Roman station here.——A statue to Montesquieu is to be erected at Brede, near Bordeaux.——A statue to the painter Ribot is to be erected at Breteuil.——The "Union Artistique du Nord" is to open shortly, at Lille, an exhibition of art industries applied to the habitation.——Parliament has passed an additional vote of a million francs towards the construction of the Ecole des Arts et Métiers at Lille, which will be shortly completed.——The monument to be erected at Mée (Seine-et-Marne) to the memory of Chapu is to be carried out under the direction of MM. Daumet and Vaudremer. The sculptural portion is to be entrusted to M. Antonin Mercié. The monument will be composed of three steles in marble; the centre one will be surmounted by a reproduction of Chapu's fine figure of Immortality, from the tomb of Jean Reynaud. The two other steles will be adorned with medallions of the sculptor's father and mother.——In the course of road works at Gloughia, in Tunisia, the Government contractor has discovered two fine and well-preserved Roman statues, which have been placed in the Museum at Bardo.——The Louvre is to receive shortly several archæological curiosities discovered last year at Lambessa (Algeria), especially a fine sarcophagus of early Christian date.——The death at Paris is announced of M. Pierre Chabat, architect, at the age of sixty-five. He was a pupil of Garrez, and had filled the position of a Professor at the Conservatoire des Arts et Métiers and at the École Spéciale d'Architecture. He carried out the abattoirs at Pontoise, Biarritz, and Montereau. He was well known by numerous publications, among others his Dictionary of "Termes de la Construction," a very useful and complete work.——M. Conil-Lacoste, "architecte-réviseur" of the City of Paris, has died at the age of seventy-four. His son, also an architect, took part in the work of construction for the 1889 Exhibition.——We have to record also the death of M. Riffaud, contractor, who has had a share in many of the larger works in Paris and its environs, especially the new Louvre, the Comptoir d'Escompte, the Crédit Lyonnais, the Château of Chantilly, the Hôtel de Ville, the Pavillon Marsan, and the Church of the Sacré Cœur; he also carried out the new portions of the Faubourg St. Honoré, and the alterations in the neighbourhood of the Arc de Triomphe. He began life as a simple stonemason.

MISCELLANEOUS.

FREE LECTURES AT CARPENTERS' HALL ON MATTERS CONNECTED WITH BUILDING.—Under the auspices of the Worshipful Company of Carpenters, in conjunction with the Sanitary Institute, the usual course of free lectures to artisans and others on matters connected with building has just commenced. The first lecture of the series was announced to be given on Wednesday evening last, by Sir Douglas Galton, on "Ventilation, Warming, and Lighting." The remaining lectures of the course are as follow:—January 27, Mr. P. Gordon Smith on "Building Acts and By-laws adapted to various Localities." February 3, Professor H. Robinson on "Drainage of Buildings and Building of Sewers." February 10, Professor W. H. Corfield on "Water Supply and the Pollution of Water." February 17, Professor Banister Fletcher on "Sanitary Building Construction." February 24, Professor A. Wynter Blyth on "Sanitary Appliances." March 2, Professor T. Roger Smith on "Sanitary Construction of Public Buildings."

PROGRESS AT WEST HARTLEPOOL.—This town, judging from recent proceedings of the Council, appears to be fully alive to the duties devolving upon it in view of the very rapid increase in its population. A large outfall sewer for the Northern District has recently been completed. A new cemetery, twenty acres in extent, with boundary wall and specially-designed drainage, is now in progress, and is expected to be completed shortly. New abattoirs are to be erected as soon as a suitable site can be obtained. A large central depôt and stable yard has been completed, with stabling for all the Corporation horses, cart-sheds for forty carts, steam-roller house, and special machinery for cutting chaff and grinding corn for horses. Besides the new station for the fire brigade, with special drying tower for the hose pipes, a new façade to the Public Market, composed of six large three-story shops and offices, is to be built at once; the designs and plans were approved at the last Council meeting. Two new intercepting sewers of large dimensions are to be proceeded with at an early date, one along the Burn Valley, as an outlet for the Park district (which is rapidly developing), and the other as an outlet for the entire western section of the borough. New streets at an estimated cost of many thousands of pounds are also in hand. A large scale-plan of the borough has been made, and a survey of the whole of the sewers in the borough is in progress, which will give the position, direction of flow, size, kind, depth, and condition, together with the manholes, ventilators, and gullies. Mr. J. W. Brown, A.M.Inst.C.E., F.G.S., the Borough Engineer, who has designed and carried or is carrying out the whole of the above works, would appear to have plenty of work on hand at present.

THE COPPER TRADE IN 1891.—Messrs. Stedman, Crowther, & Co.'s "Metal Report for 1891" says that the copper trade was very active during the year for both consumption and speculation. Supplies from the United States increased 14,000 tons; those from Chili were 5,000 tons less than in 1890, a result arising in large measure from the civil war in that country. The imports from other sources altered but little, but deliveries so far exceeded supplies that the stock was reduced 8,000 tons during the twelvemonth, and to a smaller figure than it had touched for four years. The exports of manufactured copper showed considerable increases over those of 1890, especially to Brazil, the Levant, and the East Indies; shipments to India, however, were yet a long way below those of the years 1884 to 1887, periods of low values. In the Warrant market G.M.B. copper fell during the first three months from 53*l.* to 51*l.*, notwithstanding decreases in stock and irregular supplies from Chili. In March an upward movement began which was helped by the news of the closing of the Anaconda Mine in America. The rise continued till June, when G.M.B. touched 56*l.* 10s., the highest point during the year. In July, large forward sales caused a relapse to 51*l.* 10s., followed by a recovery to 53*l.* The prompts of this copper, when they fell due in October, were met by a supply of warrants that had been held off the market for some considerable time, and the oversupply of cash copper brought about a decline of 5*l.* per ton. In November the market was further depressed, partly by the re-opening of the Anaconda Mine, and partly by the fear that part of the large stock of copper held by the Société des Métaux in France would be thrown on the market when the works were put up to auction by the liquidator of the company. This sale was successfully concluded on December 2, when there followed a strong reaction, and G.M.B. advanced from 44*l.* 10s. to 47*l.* 5s. The rise held but a short time, as a desire to realise, and lower quotations from America, brought back the market to 44*l.* 10s. Good buying the last week of the year sent the price up again to 46*l.* 12s. 6d. cash.

LECTURES AT YORKSHIRE COLLEGE.—Mr. W. Spinks, Lecturer in the Sanitary Engineering Department of Yorkshire College, Leeds, is delivering a series of Thursday afternoon lectures at the College on Sanitary Science as applied to Towns; The Public Health Acts, 1875 and 1890; The Rivers Pollution Prevention Act, 1876; and The Sewering of Towns. The latter subject includes the selection of lines and routes; sewage and rainfall; sizes, inclinations, flow, and discharges of sewers; construction and materials; ventilation and cleansing; and sewage disposal works.

INSTITUTION OF MECHANICAL ENGINEERS.—The annual general meeting of this Institution will be held on February 4 and 5, in the hall of the Institution of Civil Engineers, Great George-street. The papers to be read and discussed (after the adoption of the annual report, the election of officers, &c.) will be (1) "Notes on Mechanical Features of the Liverpool Waterworks, and on the supply of Power by pressure from the public mains, and by other means," by Mr. Joseph Parry, Water Engineer, Liverpool; and (2) "On the Disposal and Utilisation of Blast Furnace Slag," by Mr. William Hawdon, of Middlesbrough.

BOROUGH SURVEYORSHIP, LUTON.—Mr. T. Ridyard Roscoe, C.E., Assistant Surveyor, Islington Vestry, N., has been appointed Borough Engineer and Surveyor of Luton, in succession to Mr. E. J. Lovegrove, A.M.Inst.C.E., who was recently appointed Borough Surveyor of Richmond.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premium.	Designs to be delivered.
Wesleyan Chapel & Schools, Blaina, Mon.	Rev. Joseph Wells....	.....	Feb. 2
*Iron Swing Bridge	Sandwich Corporation	15*l.*	Feb. 17
*Promenade Pier.....	Beaumaris Corp.	10*l.* 10s.	Mar. 1

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor or Engineer.	Tenders to be delivered.
*Drainage Works	Richmond (Surrey) Town Council	J. Lemon	Jan. 25
*Restoration of Windows	Camberwell Bur. Bd.	E. R. W. Whellock ..	do.
Fire Clay Retorts	Sowerby Bridge L. B.	J. Marsland.....	Jan. 26
*Road-making and Paving Works.....	Willesden Loc. Bd. ..	O. Claude Robson	do.
*Works and Materials	Hammersmith Vestry	*Official*	Jan. 27
*Granite Kerb	Worthing Corp.	do.	do.
Street Works	Cardiff Corporation ..	do.	do.
*Warming and Ventilsting Town Hall....	Leeds Corporation....	do.	do.
*Removal of House Refuse, &c.	St. Pancras Vestry ..	do.	do.
*Works and Materials	Chelsea Vestry	do.	Jan. 28
Re-roofing Corn Market, Wakefield.....	Corn Exchange Co.....	W. Watson	do.
Pipe Drain and Brick Tunnel	Gateshead Town Improvement Com.	J. Bower	do.
Widening Waver Bridge, Wigton	Cumberland C. C.	C. J. Ferguson	Jan. 29
Fifty Workmen's Houses, Southmoor, Chester-le-Street.....	.....	J. W. Rounthwaite ..	do.
*Making-up Roads, &c.....	Walthamstow Loc Bd.	G. W. Holmes.....	do.
Sewerage Works	Cardiff U.R.S.A.....	T. Waring & Son	Jan. 30
New Road, near Blackwood	Mynyddislwyn H. B.	*Official*	do.
*Repairs to St. Margaret's Churchyard	Burial Bd. of St. Margaret's, Westminster	do	do.
Training Home Buildings, Sheffield.....	Sheffield Gas Co.	H. W. Lockwood	do.
Gasholder Tank, Grimsthorpe Station....	Coxhoe (Durham) Bd. School	F. W. Stevenson	do.
Alterations, &c School, East Hetton	Islington Vestry	*Official*	Feb. 1
*Three Snow Ploughs	.....	do.	do.
Porter's Lodge, Waiting Room, Laundry, Fences, &c. Lodge Moor	Sheffield Town Coun.	Flockton & Gibbs	do.
Additions, &c. "Bush Inn," Aberdare....	Standish-with-Langtree Local Board....	C. H. Elford.....	do.
*Cast-iron Pipes	Finchley L. B.....	Heaton & Ralph.....	do.
*Making-up Roads	Buckingham U.S.A...	*Official*	do.
*Waterworks.....	Tottenham Loc. Bd. ..	B. Latham	Feb. 2
*Pipe Sewers.....		J. E. Worth	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Four Shops and Houses, Taff-street, Pontypridd	D. R. Evans.....	A. O. Evans	Feb. 2
*Making-good Roads	Southend Loc. Bd.....	Peter Dodd	do.
Business Premises, High-street, Southampton	Edward Cox.....	W. Burrough Hill....	Feb. 3
Two Dwelling-houses, Dufftown, N.B.....	P. M'William	.....	do.
*Footbridges.....	Gt. Western Ry.....	*Official*	do.
*Engine House, Pumping Station, &c.	Maidstone Wtrwks Co.	E. Easton & Co.	do.
Additions, &c. Schools, Williamstown, Penygraig	Llantrisant Board Sch	J. J. Evans	Feb. 4
Sewerage Works	Ystradyfodwg L. B. ..	J. W. Jones	do.
Private Road Improvement Works	do.	do.	do.
*Broken Granite	Norfolk C. C.	T. H. B. Heslop	Feb. 6
*Additions, &c., to Ambulance Station, Fulham	Metro. Asylums Bd...	A. & C. Harston	Feb. 8
*Road Materials	H. M. Works	*Official*	do.
*School and Cookery Kitchen	Northfleet Sch. Bd. ..	Walford & Legg	do.
*Public Hall and Municipal Offices.....	West Ham Council ..	Lewis Angell	Feb. 9
*Removal of Dirt, Dust, &c.	Crown Estate Paving Commissioners.....	*Official*	Feb. 10
*Drainage Works.....	West Ham Union	J. M. Knight	do.
Bridge and Covering over Water	Bristol Corporation ..	F. Fox	Feb. 12
*Erection of Workhouse	St. Giles, Camberwell, Guardians	Wilson, Son, & Aldwinckle	Feb. 15
*Sewerage Works	Guildford Corporation	C. N. Lailey	Feb. 16
*Public Baths	Shrewsbury Corp.	J. Johnson	Feb. 22
*Superstructure of Mill.....	Atherton Cotton Spinning Co.	Bradshaw & Gass	No date
*Carriage Factory, Tunbridge Wells	.....	H. H. & E. Cronk	do.
Additions to Barracks, Lichfield	War Department	*Official*	do.
Banking Premises, Bridlington, Yorks ..	York Union Bank Ltd.	Smith & Brodrick	do.
Twelve Through Houses, Leicester-place, Leeds	.....	W. A. Hobson	do.
*Pair of Semi-detached Villas	Ramsgate Corp.	Hill & Co.	do.
*Library Buildings, Southampton	The Committee	*Official*	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Sanitary Inspector	Islington Vestry.....	104*l.*.....	Feb. 3
*Valuer and Surveyor	Vestry of Shoreditch	.....	Feb. 5
*Inspector of Nuisances	Norwich T. C.	175*l.*	Feb. 6
*Surveyor and Inspector of Nuisances	Ashford L. B.	150*l.*	Feb. 16

Those marked with an Asterisk (*) are advertised in this Number. *Competitions, p.* iv. ***Contracts, pp.*** iv., vi., viii, & ix. ***Public Appointments, p.*** xx. & xxi.

THE SLADE PROFESSORSHIP OF FINE ARTS AT CAMBRIDGE.—The Vice-Chancellor gives notice that the Professorship of Fine Art in the University of Cambridge, on the Foundation of Felix Slade, Esq., will become vacant on February 22, and that the election of a new Professor will take place on Tuesday, February 23. The Professor will receive by way of stipend the dividends of a sum of 12,186*l.* 12s. 7d. New Two and Three-quarters per Cent. Consolidated Annuities. He is not required to reside at the University. Candidates are requested to send their names to the Vice-Chancellor on or before Tuesday, February 16.—*Cambridge Chronicle.*

THE ENGLISH IRON TRADE.—The English iron market continues very quiet, and there are no indications of an immediate revival. Very little change is exhibited in any of the branches of the trade, and prices remain practically unaltered. Pig-iron is still dull at most of the centres; but a slightly better tone has been manifested in the Cleveland market. Manufactured iron is only in moderate request, and in the steel trade business generally is not too brisk, except in shipbuilding material, which, however, in the North-west is in lessened demand. The tinplate trade is still quiet, but better times are anticipated. Shipbuilders and engineers are, on the whole, moderately busy. The coal trade exhibits fair activity.—*Iron.*

THE SANITARY INSPECTORS' ASSOCIATION.—In consequence of the death of the Duke of Clarence, the annual dinner of this Association has been postponed from February 6 to March 12.

SETTING CIRCULAR SAWS.—Messrs. A. Ransome & Co. send us the description and illustration of an apparatus for setting the teeth of circular saws with rapidity and a certainty of the right set. The saw is mounted horizontally on a travelling pivot, to suit any circumference of saw; the periphery of the saw rests on an anvil with a bevel on the edge. The saw is turned round and a blow of a hammer on each alternate tooth gives it the angle of the bevel, all the teeth being necessarily set at the same angle. The saw is then reversed and the remaining alternate teeth set in the same way. The bevel is eccentric, and the anvil can be turned on its axis so as to give any required angle of setting.

THE NORTHERN OF SWEDEN TRUNK RAILWAY.—Work on the Northern of Sweden Trunk Railway, a line running right through the whole of Northern Sweden, and which is to be continued to the Russian frontier, is actively progressing. The other day a further section, 30 kilomètres in length, was opened, making its total length from Stockholm 858 kilomètres, and by 1894 it is expected that the distance to Boden will have been covered, 300 kilomètres. Thereby this railway and those of the rest of Sweden will have joined the Lulea-Gellivara Railway. The distance hence to the Finnish frontier is estimated at some 500 kilomètres. On the other hand, the Northern of Finland Railway now terminates at Uleåborg, about 150 kilomètres from the same.

UNSEASONABLE STREET SCAVENGING.—Travellers in Holland know that there is in general use there a method of street scavenging which consists in thoroughly washing the surface with water from a hose, followed by a good brushing. Dwellers in London will have noticed that in certain parishes an attempt has been made to adapt this cleanly Dutch custom to English ways, but with a difference; for, whereas in Holland the washing is done at cock-crow, and the man with the hose is closely followed up by an army of sweepers, the time chosen in London appears to be from nine to noon, and the street,—and often the pavement also,—is allowed to remain for long covered by a mixture of mud and water, with which the two or three languid sweepers are unable to cope. The consequence is that thousands who have trusted to the absence of rain to take them to shops or offices dry shod, find themselves quickly suffering from the miseries and dangers of wet feet. Probably in no other city in the world would such a piece of blundering bumbledom be allowed to continue for a week.—*British Medical Journal.*

TRADES HALL FOR EDINBURGH.—It was briefly announced at the meeting of the Edinburgh Trades Council on the 5th inst. that a gentleman in Edinburgh had made the offer of a sum of money for the purchase of premises to be used as a centre for trade organisation in the city. The sum which he has offered amounts, it is said, to 4,000*l.*, and he is willing to increase the amount if necessary. The offer has been made through the officials of the Trades Council, and already the project has been so far advanced that the building known as the Trades Hall in the High-street has been purchased. The Trades Hall, originally a bank, afterwards used as a Free Church, then purchased by the Good Templar organisation, is a commodious building, having a large upper and smaller lower hall, a number of committee rooms, a range of vaults, keeper's house, and other accessories, and is at present largely used by the trades as a meeting-place. It will require an extensive overhaul, but as the purchase price of the building is understood to be 2,700*l.*, that leaves a balance of 1,300*l.* for renovation. The premises will be under the management of a Trades Committee, and will be used as a centre of labour propagandism, which will be pushed by means of lectures, by the formation of a library, and in other ways. It is probable that such terms will be offered to trade unions as will induce them to make the hall their meeting-place, instead of meeting, as at present, in different places in the town.—*Scotsman.*

LEGAL.

CASE UNDER THE METROPOLIS LOCAL MANAGEMENT ACT:

WANDSWORTH DISTRICT BOARD OF WORKS *v.* LOWER.

THIS case came before Mr. Denman, at the Wandsworth Police-court, on the 13th inst. The defendant, a local builder, was summoned under section 76, Metropolis Local Management Act, for a breach of the Regulations for the Construction of New House-drains, adopted some time since by the Wandsworth District Board of Works, in respect of two new houses, Rectory Grove, Clapham. Mr. W. W. Young, Solicitor to the Board, supported the summons.

Mr. S. Fairchild, Sanitary Inspector for the Parish of Clapham, stated that the stoneware traps of the waterclosets were not connected to the soil-pipes by means of sound and suitable joints, as required by the Regulations, but that the joints were made by simply inserting the outgo of the traps into the branch piece of the soil-pipes and stopping it round with red-lead. And, also, that the waste-pipes from the sinks were fixed without syphon-traps intervening between the sinks and the discharging ends, the Regulations requiring that waste-pipes from lavatories, baths, and sinks shall be trapped at the outgo of the receptacles and made to discharge outside over the seal of syphon gulley trap. Inspector Fairchild produced models and drawings, and explained how the work should be executed so as to ensure the sanitary condition of new houses.

The defendant took several exceptions to the regulations, and finally contended that the Board of Works had not the power to make drainage regulations under the Metropolis Local Management Acts.

Mr. Denman, the magistrate, in giving his decision, said that the Board had the power under section 76 to make regulations, and he must decide against Mr. Lower.

Mr. Young did not press for a penalty, this being the first case in respect to these regulations, and he would be satisfied if the defendant undertook to make the necessary alterations within a month.

The learned magistrate advised Mr. Lower to adopt this course, and he consented to do so.

EMPLOYERS' LIABILITY:

PATMORE *v.* KENNERLEY.

IN the City of London Court last week, before Mr. Julian Robins (Deputy Judge), the case of Patmore *v.* Kennerley & Shiefer was heard, in which the plaintiff, John Patmore, bricklayer, sought to recover 50*l.* damages for personal injuries sustained in an accident caused by the alleged negligence of the men in the employment of the defendants, Messrs. Kennerley & Shiefer, builders, 31, Lombard-street, E.C.

Mr. Walters, counsel for the plaintiff, said the accident happened on October 2 last, at the New English Homes, Holloway-road, which were being built by the defendants, the plaintiff at the time being a bricklayer in the service of the defendants. The building was being erected without any scaffolding at all. As the building progressed, the beams of each floor were put in, and a structure called a Yankee jib was put up at the top, which was used for the purpose of raising materials.

The Deputy Judge: It is a sort of crane?

Mr. Lynch (for the defendant): It is a derrick.

Mr. Walters, continuing, said as each floor was raised, the defendants built up the next floor upon trestles, the beams were then put in on the floor

above, and the jib was raised to the next floor, and so on. The sole access to the top of the building was by means of a ladder which was placed in such a position that when the crane was being worked it caused it to become very dangerous. Bricks and mortar were constantly dropping on to the heads of those who had to use the ladder, and the plaintiff had on several occasions complained to the defendants' foreman about the unsafety of the place. He was only laughed at. While the plaintiff was descending from the ladder when about half way down a quantity of bricks and masonry work fell from the top, and this would have struck the plaintiff on the head, the consequences being very serious. Seeing the great danger the plaintiff was in, several people shouted to him to jump to the ground. Knowing the chances he ran if he stayed on the ladder, the plaintiff jumped to the ground, a distance of 25 ft. He was seriously injured as it was; but had the plaintiff not jumped, the bricks would have fallen on his head. He was immediately removed to the Great Northern Hospital, where he was detained for eight days, and afterwards attended the hospital for ten weeks as an out-patient. This claim for damages was now raised under the provisions of the Employers' Liability Act, because of the defect in the non-protection of the space above the ladder—the only means of access.

For the defence, Mr. Jubal Kennerley, one of the defendants, stated that he was present when the unfortunate accident happened to the plaintiff. The plaintiff should have used a different ladder to the one he came down by on the day in question. Witness never knew that the ladder the plaintiff did use was dangerous. He had gone up and down it himself. The accident was brought about by the man in charge of the derrick pulling it in too early, when several bricks fell out. There was no need for the plaintiff to have jumped as he did. The truth was, the plaintiff became frightened, and hearing men calling out, being a nervous man, he jumped to the ground. In cross-examination, he said the structure used for raising the building was much in vogue in America. No security was provided by boarding in the place, because it was not necessary.

The defendant's foreman denied that any complaints were ever made to him about the defective condition of the works.

The Deputy Judge, having regard to the importance of the case, said he would take time to consider his judgment. Two days later he delivered judgment at great length, finding for the plaintiff for 45*l.* and costs.

MEETINGS.

SATURDAY, JANUARY 23.

Royal Institution.—Professor J. A. Fleming on "The Induction Coil and Alternate-Current Transformer." I. 3 p.m.

MONDAY, JANUARY 25.

Royal Institute of British Architects.—Address to Students by the President, Mr. J. Macvicar Anderson, who will present the Prizes and Studentships for the year 1891-92. 8 p.m.

Royal Academy of Arts.—Professor Aitchison, A.R.A., on "Saracenic and Turkish Architecture." I. 8 p.m.

Society of Arts (Cantor Lectures).—Professor George Forbes on "Developments of Electrical Distribution." I. 8 p.m.

Liverpool Architectural Society.—The Rev. F. F. Grensted on "The Rise of Civilisation in Babylonia." 7 p.m.

TUESDAY, JANUARY 26.

Society of Arts (Applied Art Section).—Mr. William Morris on "The Woodcuts of Gothic Books." (Illustrated by Lantern Slides). 8. p.m.

Institution of Civil Engineers.—(1) Further Discussion on Mr. Wilfrid Airy's Paper on "Weighing-machines." 8 p.m. (2) Reception by the President and Council in the Library. 9 p.m.

Glasgow Architectural Association. — Mr. James Lindsay, A.R.I.B.A., on "Approximate Estimating." 8 p.m.

Liverpool Engineering Society.—Adjourned Discussion on Mr. A. J. Maginnis's paper on "Transatlantic Lines and Steamships." 8 p.m.

WEDNESDAY, JANUARY 27.

Carpenters' Hall, London Wall.—Mr. P. Gordon Smith, F.R.I.B.A., on "Building Acts and By-Laws for Controlling the Construction of Buildings, adapted to various localities. 8 p.m. (*Admission Free*).

Royal Meteorological Society.—Annual General Meeting. Address by the President (Mr. Baldwin Latham, M.Inst.C.E.) on "Evaporation and Condensation." 7.15 p.m. (Postponed from the 20th inst. in consequence of the death of the Duke of Clarence.)

Society of Arts.—Mr. F. W. Edridge-Green on "The Scientific Value of Lovibond's Tintometer." 8 p.m.

St. Paul's Ecclesiological Society.—Mr. T. A. Martin on "Some Religious Subjects on Misericordes." 7.30 p.m.

THURSDAY, JANUARY 28.

Royal Academy of Arts.—Professor Aitchison, A.R.A., on "Saracenic and Turkish Architecture." II. 8 p.m.

Royal Institution.—Dr. A. S. Murray, on "Some Aspects of Greek Sculpture in Relief." II. 3 p.m.

British Museum. — Miss Millington-Lathbury on "Greek Temples, and leading motives of Greek Religion," as illustrated by the monuments in the Museum. 2.45 p.m.

Institution of Electrical Engineers. — Inaugural Address by the President, Professor W. E. Ayrton, F.R.S. 8 p.m. (Adjourned from the 14th inst. in consequence of the death of the Duke of Clarence.)

Society of Antiquaries.—8 p.m.

Edinburgh Architectural Association.—8 p.m.

FRIDAY, JANUARY 29.

Architectural Association. —Mr. N. H. J. Westlake on "Fashion in Architecture and its kindred Arts." 7.30 p.m.

Institution of Civil Engineers.—Students' meeting. 7.30 p.m.

Liverpool Engineering Society.—Annual Dinner.

SATURDAY, JANUARY 30.

Royal Institution.—Professor J. A. Fleming on "The Induction Coil and Alternate-Current Transformer," II. 3 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

20,215.—WINDOWS: *W. Hooker.*—This patent relates to an improved system of hanging sliding windows to be opened from the inside, for cleaning, &c., by detachable hinges, the wings of which are attached to plates on sash-frames and sashes, the plates being slotted and dovetailed to receive the wings. The lower wings of hinges are connected to the plate on the frame and the upper wing in a similar manner to the style of sash.

2,534.—SCAFFOLDING: *W. Parsey.*—Instead of the usual mode of timber scaffolding, scaffolds of iron or steel bars are constructed of suitable shapes, such as angles, tees, &c., all the parts of which are interchangeable in their relative positions, and have holes drilled or punched in them at some uniform pitch throughout, or are provided or formed with equivalents, so that they can be put together by bolts and nuts, cotters, or drifts, or the like to form pillars, girders, or other forms, with the distance and diagonal bracing bars to form perfectly rigid structures of various dimensions. The scaffolding may be taken down and used over and over again.

3,056.—METALLIC CHIMNEYS: *T. P. Lomas.*—This specification relates to improvements in the manufacture of metallic chimneys and flues. Sheet-metal, copper, tin, or other metallic plates are cut approximately to the required sizes. These pieces are sheared, stamped, pressed, corrugated, buckled, and flanged to fit them to form portions of the chimneys. In some cases the whole of the plate is corrugated and buckled except the flanged edges, the plate being made in portions of cylinders or of a frustrum of a cone. In other cases the plates are stamped out plain and rectangular with flanges all round, and sometimes tapered at one end, and when riveted, grooved, or soldered together they form polygonic structures for various purposes.

11,812.—DOORS AND GATES: *R. H. Dawe.*—This patent relates to an appliance for fastening and securing doors and gates, and facilitating opening and closing of same. This is effected by means of a stay with a knuckle-joint or hinge in or near the middle, each end of the stay being provided with a plate, bracket, or staple attached, the one end to the door, and the other to a post, wall, or other suitable place.

17,389.—CHANDELIERS, &c.: *R. Roderick.*—This relates to a method of supporting and retaining in position gasaliers, chandeliers, and the like, by using a circular, oblong, or other shaped collar of metal, which forms the balance weight, instead of the separate weights now used. To the metal collar, which extends round the tube of the gasalier, &c., the usual chains are connected, and the gasalier can be raised or lowered in the usual way.

19,131.—SASH-CORDS: *E. J. Jeyes & C. J. E. Kinslow.*—By this invention it is proposed to remedy the defects in the usual method of attaching sash-cords to window-sashes. These defects are stated to be the liability of the cords to be broken away from the sash, and the expense of fitting. The improvement is effected by means of a metal bush or ring with a cut away part, perforations, and bevelled or sharpened lower edges, the whole being sunk into the window-sash. The end of the cord is passed through the cut away part and knotted.

NEW APPLICATIONS FOR LETTERS PATENT.

January 4.—155, H. Schmidt, Iron Retaining Wall.

January 5.—165, T. Hunt, Glazing Earthenware Pipes, Tiles, &c.—166, A. Cannon, Chimney-pots.—174, G. Deacon, Glazing Roofs, &c.—187, G. Skinner & J. Hill, Attaching Door-knobs or Handles to their Spindles.—190, S Dix, Water-closets.—215, A. Boult, Fire-grates.

January 6.—251, H. Cribb, Preparing, Fitting, and Laying Blocks for Floors, &c.—258, J. Cosstick, Chimney-pots for preventing downward Draught.—285, R. Barker, Sewer-pipe and Drain-tile Machines.—286, R. Barker, Sewer-pipe and Drain-tile Machines.—308, W. Sykes, Jointing Earthenware Pipes, &c.

January 7.—323, A. Whittome, Wood-block Floors.—337, T. Helliwell, Glazing Buildings.—364, H. Conolly, Water-closets.

January 8.—G. Parkinson, Guarding Circular or other Saws.—432, A. Ford, Bolts for Doors, Windows, &c.—446, A. Haworth, Pipes for Sinks.

January 9.—488, T. Wilkinson, Joints for Sewer and other Pipes.—489, H. Warrington, Kilns or Ovens for Bricks, &c.—497, F. Lorch and others, Construction of Hinge-joints.—507, G. Martin, Screw-drivers.

PROVISIONAL SPECIFICATIONS ACCEPTED.

17,854, J. Green and G. Meecle, Window Sash-fasteners.—20,323, A. Fiddes and others, Hot-water Apparatus for Heating Horticultural Buildings, &c.—20,549, S Kirk and W. McYougal, Lock and Hanging Window-frame and Sash.—20,643, R Rankin, Marking the Styles and Rails of Doors and Sashes and other Joiners' Work for Mortising while on Slide of Tenoning-machine or otherwise.—20,798, M. Reed, Slow Combustion Stoves.—20,815, H. Dent and J. South, Furnaces and Domestic Fireplaces.—20,853, E Heydenreich, Tool-holder.—21,142, W. Adams, Ceiling Roses for Electrical Fittings.—21,148, J. M. Hardy and W. Garland, Upright Sawing-machines.—21,520, T. Harries, Artificial Stone.—21,763, J. Saunders, Opening and Closing Fanlights, Casements, &c.—22,202, C. Henshaw, Shop Door and Casement-fasteners.—22,212, E. Wilson, Machines for Curving or Shaping Wood.—22,562, W. Horn, Brick Kiln.

COMPLETE SPECIFICATIONS ACCEPTED.

(*Open to Opposition for Two Months.*)

3,877, C. Green, Window Ventilation of Dwelling-houses and other Buildings.—16,518, W. Thompson, Blocks or Stones for Use in the Sinking of Wells or Shafts and in the process of placing the same in position.—20,210, R. McMillen, Window-sash Balance.—21,423, P. Jensen, Heating Buildings by means of Steam or Hot-Water.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

JANUARY 12.—By *G. F. Francis*: 11, 13, and 15, Page-st., Westminster, u.t. 8½ yrs., g.r. 60*l.*, r. 150*l.*, 200*l.*—*Rogers, Chapman, & Co.*: "Cumberland Lodge," Streatham Hill, u.t. 43 yrs., g.r. 23*l.*, 990*l.*

JANUARY 13.—By *Tobin & Sons*: 49 and 50, Greenfield-st., Whitechapel, f., r. 76*l.* 14s., 680*l.*—By *H. & A. Harris*: 15, Lambton-rd., Hornsey, f.. r. 32*l.*, 445*l.*; 74, Shaftesbury-rd., u.t. 83 yrs., g.r. 7*l.*, r. 36*l.*, 340*l.*—By *Elgood & Fuller*: 18, York-ter., Regent's-park, u.t. 29½ yrs, g.r. 8*l.*, r. 212*l.* 11s., 2,060*l.*, 41, Devonshire-st., Portland-place, u.t. 18½ yrs., g.r. 68*l.*, r. 160*l.*, 780*l.*

JANUARY 14.—By *W. W. Jenkinson*: 152, Queen's-rd., Peckham, f., r. 40*l.*, 520*l.*—By *Newbon & Co.*: 14 and 15, Upper North-st., Caledonian-rd., u.t. 53 yrs., g.r. 10*l.*, r. 54*l.*, 435*l.*; 102, Walton-st., Chelsea, u.t. 50 yrs., g.r. 2*l.*, r. 45*l.*, 660*l.*; 49, First-st., u.t. 53 yrs., g.r. 5*l.*, r. 42*l.*, 460*l.*; 35, 37, and 39, Hungerford-rd., Holloway, u.t. 69 yrs., g r. 14*l.*, r. 127*l.*, 1,145*l.*; 59, 61, 63, and 71, Hungerford-rd., u.t. 69 yrs., g.r. 16*l.* 6s. 8d., 1,620*l.*; 2 and 4, Isledon-rd., u.t. 51 yrs., g.r. 10*l.* 10s., r. 60*l.*, 645*l.*

JANUARY 15.—By *Baker & Sons*: F.g.r. of 38*l.*, Regent's-sq., with reversion in 13 yrs., 2,075*l.*; f.g.r. of 24*l.*, Sidmouth-st., with reversion in 10 yrs., 1,305*l.*; f.g.r. of 21*l.* 10s., Pembridge Villas, Bayswater, with reversion in 51 yrs., 615*l.* By *R. W. Scobell*: No. 41, Fitzroy-sq., f.r. 225*l.*, 2,020*l.*; l.g.r. of 22*l.*, Albany-st., &c., Regent's Park, u.t. 32 yrs., g.r. 10*l.*, 165*l.*; l.g.r. of 22*l.*, Albany-st., u.t. 32 yrs., with reversion for 24 yrs., 805*l.*; l.g.r. of 103*l.* 4s., Albany-st., u.t. 32 yrs., with reversion for 7½ yrs., 2,550*l.*; improved rental, Brewer-st., Pimlico, u.t. 31 yrs., g.r. 11*l.*, r. 84*l.*, 960*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G.	ton	9/0/0 0/0/0
Teak, E.I..	load	9/10/0 15/0/0
Sequoia, U.S.ft.cu.		2/3 3/0
Ash, Canada	load	2/10/0 4/0/0
Birch, do.		3/0/0 4/5/0
Elm, do.		3/10/0 4/15/0
Fir, Dantsic, &c.		2/0/0 3/10/0
Oak, do.		2/10/0 4/10/0
Canada		5/0/0 7/0/0
Pine, Canada red		2/10/0 3/10/0
Do, yellow		2/10/0 5/0/0
Lath, D'ntsic, fath		5/5/0 6/10/0
St. Petersburg		5/10/0 7/10/0
Deals, Finland, 2nd & 1st std	100	8/10/0 10/10/0
Do, 4th & 3rd		7/10/0 8/10/0
Do. Riga		6/10/0 8/0/0
St. Petersburg, 1st yellow		10/10/0 15/0/0
Do. 2nd yellow		8/10/0 10/0/0
Do. white		7/0/0 10/10/0
Swedish		7/15/0 16/0/0
White Sea		8/10/0 17/10/0
Canada, Pine 1st		19/10/0 25/10/0
Do. do. 2nd		14/10/0 16/10/0
Do. do. 3rd, &c.		6/10/0 10/10/0
Do, Spruce. 1st		8/10/0 11/0/0
Do. do. 3rd & 2nd		6/10/0 8/0/0
New Brunswick		7/0/0 7/10/0
Battens, all kinds		3/10/0 15/10/0
Flooring Boards, sq., 1 in. prep. 1st		0/8/6 0/14/6
Do. 2nd		0/7/6 0/11/8
Other qualities		0/5/3 0/8/0
Cedar, Cuba	ft.	/3½ /4½
Honduras, &c.		/3½ /4½
Mahogany, Cuba. 1st. Domingo, cargo av		/4½ /6½
Mexican do. do		/4 2'0
Tobasco do. do		/5½ /5
Honduras do..		/5½ /7
Box, Turkey	ton	4/0/0 18/0/0
Rose, Rio		10/0/0 20/0/0
Bahia		9/0/0 18/0/0
Satin, St. Domingo	ft.	0/0/9 0/1/3

TIMBER (*continued*).		
Satin, Porto Rico		0/0/10 0/1/6
Walnut, Italian..		0/0/3½ 0/0/7
METALS.		
IRON—Pig, in Scotland	ton	2/7/0 2/7/3
Bar, Welsh, in London		6/0/0 6/2/6
Do. do. at works in Wales		5/10/0 5/12/6
Do. Staffordshire, in London		6/10/0 6/15/0
COPPER—British, cake and ingot		49/0/0 50/10/0
Best selected		53/0/0 51/10/0
Sheets, strong..		59/0/0 60/0/0
Chili, bars		45/10/0 45/17/6
YELLOW METAL	lb.	0/0/5½ 0/0/5¾
LEAD—Pig, Spanish	ton	11/3/9 11/6/3
English, com. brands		11/7/6 11/10/0
Sheet, English, 3 lbs. per sq. ft. and upwards		13/5/0 0/0/0
Pipe		13/15/0 0/0/0
ZINC—English sheet	ton	25/0/0 25/10/0
Vieille Montagne		26/10/0 0/0/0
TIN—Straits		90/0/0 90/10/0
Australian		90/0/0 90/10/0
English Ingots		94/10/0 95/10/0
OILS.		
Linseed	ton	18/15/0 19/2/6
Cocoanut, Cochin		26/10/0 0/0/0
Do. Ceylon		23/0/0 0/0/0
Palm, Lagos		23/0/0 23/10/0
Rapeseed, English pale		28/15/0 0/0/0
Do. brown		27/0/0 0/0/0
Cottonseed ref..		18/5/0 0/0/0
Oleine		0/0/0 0/0/0
Lubricating, U.S.		4/10/0 5/10/0
Do. refined		6/0/0 11/0/0
TAR—Stockholm	barrel	0/19/0 1/0/0
Archangal		0/12/6 0/0/0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

BECKENHAM.—For private improvement works in Lucas-road, for the Beckenham Local Board. Mr. Geo. B. Carlton, C.E., Engineer and Surveyor:—

Wo dham & Fry	£526	Mid-Kent Building and Contracting Co.	£417
E. & W. Iles	506	John Mowlem & Co.*	395
R. Mayo	436		

* Accepted.

BERKHAMSTEAD.—For the erection of a police-station, lock-up and residence, at Great Berkhamstead, for the Standing Joint Committee of the Quarter Sessions and the County Council for Herts. Mr. Urban Smith, C.E., County Surveyor, architect. Quantities by Mr. Alfred Burr:—

Stephens, Bastow, & Co.	£4,444	G. & J. Waterman	£3,827
John A. Hunt	4,176	J. Honor & Son	3,660
Jas. Payne	4,0 0	E. Smith & Son	3,650
S. Grist	3,888	F. Dupont, Colchester*	3,637

* Accepted.

LICHFIELD.—For the erection of a new Infirmary, for the Lichfield Board of Guardians. Mr. W. H. Woodroffe, architect, 214, Great Dover-street, London, S.E.:—

F. N. Stephens	£12,058	Parnell & Sons	£8,935
H. Dorse & Son	10,500	Hodges	8,790
Chas. Gray Hill	10,190	H. Willcock	8,576
G. Parker	10,150	H. Vickers	8,500
Jackson Bros.	9,590	Thos. Lowe & Sons, Burton-on-Trent*	8,400
B. Whitehouse	8,981		
G. F. Smith & Sons	8,950		

* Modified and accepted at £8,000.

LONDON.—For erecting new Infirmary, High-street, Lewisham, for the Guardians of the Lewisham Union. Messrs. A. & C. Harston, architects, 15, Leadenhall-street, E.C. Quantities by Messrs. Franklin & Andrews, 25, Ludgate-hill, E.C.:—

Allen & Sons	£62,876	A. Kellett	£52,674
Shillitoe & Son	58,953	Higgs & Hill	51,974
C. Wall	54,675	J. O. Richardson	51,450
C. Miskin	54,394	W. Johnson & Co., Wandsworth-common*	51,000
Leslie & Co.	54,250	W. Brooks	50,850
J. & M. Patrick	53,780		

* Accepted.

LONDON.—For the erection of an Administrative Block and Three Ward Pavilions at the Infirmary, Marloes-road, for the Guardians of the Parish of Saint Mary Abbotts, Kensington, W. Mr. Thos. W. Aldwinckle, architect. Quantities prepared by Mr. W. T. Farthing:—

Garlick & Horton	£56,650	Brass & Son	£42,359
J. O. Richardson	44,210	Leslie & Co.	41,355
J. Mears	43,057	Scharien & Co.	40,739
J. J. Robson	42,994	A. Kellett	40 590
J. P. Flew	42,760	C. Wall	39 243
Kirk & Randall	42,633	W. Johnson & Co.*	35,560

* Accepted.

LONDON.—For new shed, in Market-street, Bermondsey, for Messrs. P. Margetson & Co. Messrs. Elkington & Son, architects:—

S. Kipps	£1,442	A. Stephens	£1,148
W. Higgs	1,285	B. Wells	1,116
W. Castle	1,173		

LONDON.—For hot-water supply apparatus to blocks D. E. & F. of the new Workhouse at St. Pancras. Messrs. A. & C. Harston, architects:—

C. P. Kinnell & Co.	£590 0	J. & F. May	£545 0
J. Fraser & Sons	572 10	Wenham & Waters, Croydon (accepted)	455 0
Clements, Jeakes, & Co.	563 0		

LONDON.—For alterations at the "White Hart," High-street, Shadwell:—

S. L. Williamson	£409 12	Geo. Lane	£368 0
Edwards & Medway	385 0	James Cox*	365 0
Ellis & Turner	370 0		

* Accepted.

LONDON.—Accepted for the erection of residence at Blackheath, S.E., for Mr. J. H. Robinson. Mr. Ebenezer Saunders, architect:—
Kennard Bros., Lewisham Bridge £1,020 0 0
[No competition.]

LONDON.—Accepted for alterations and decorating to "Dartmouth House," Blackheath, for the Bishop of Southwark:—
Kennard Bros., Lewisham £387 10 0

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1891. 1892.

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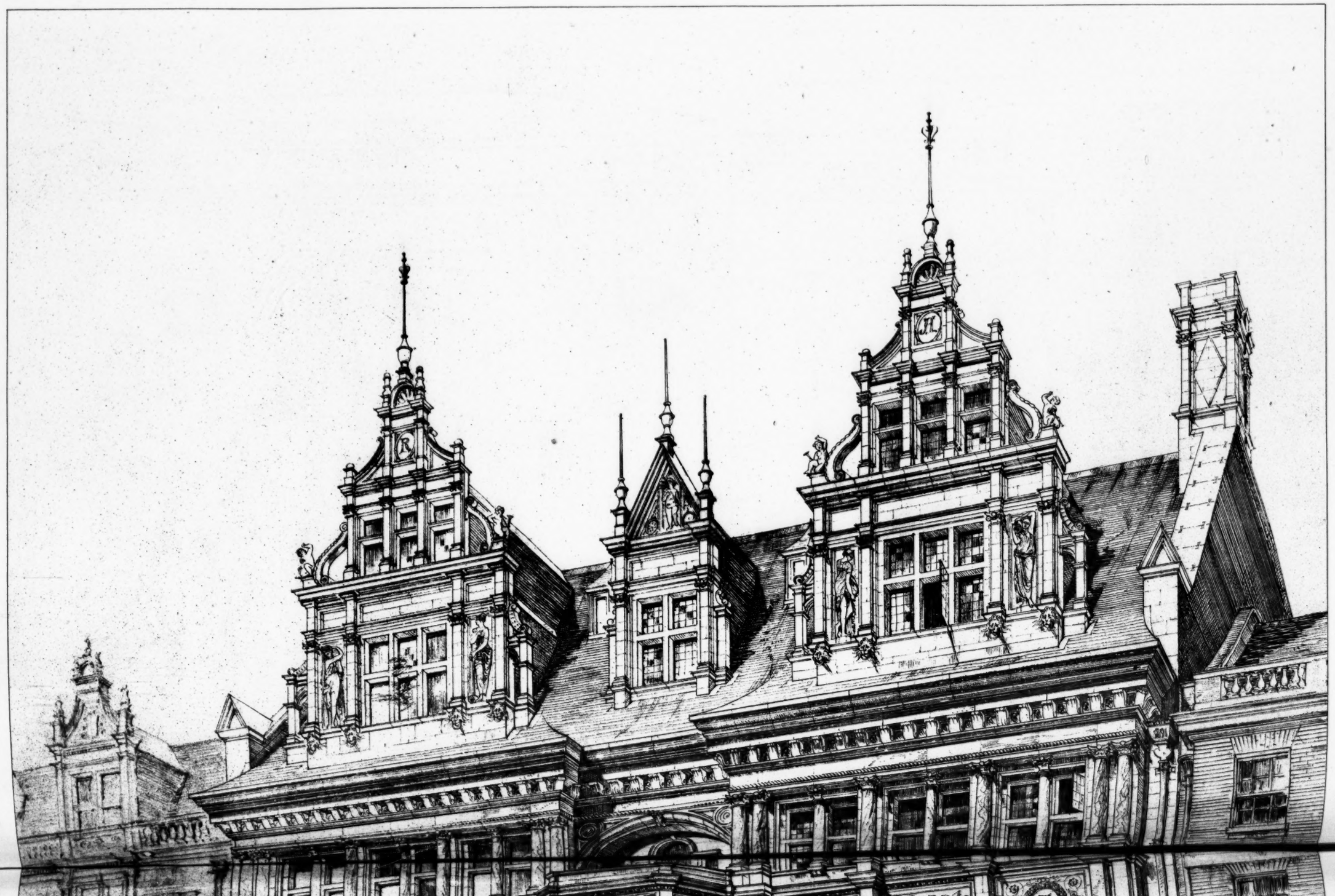

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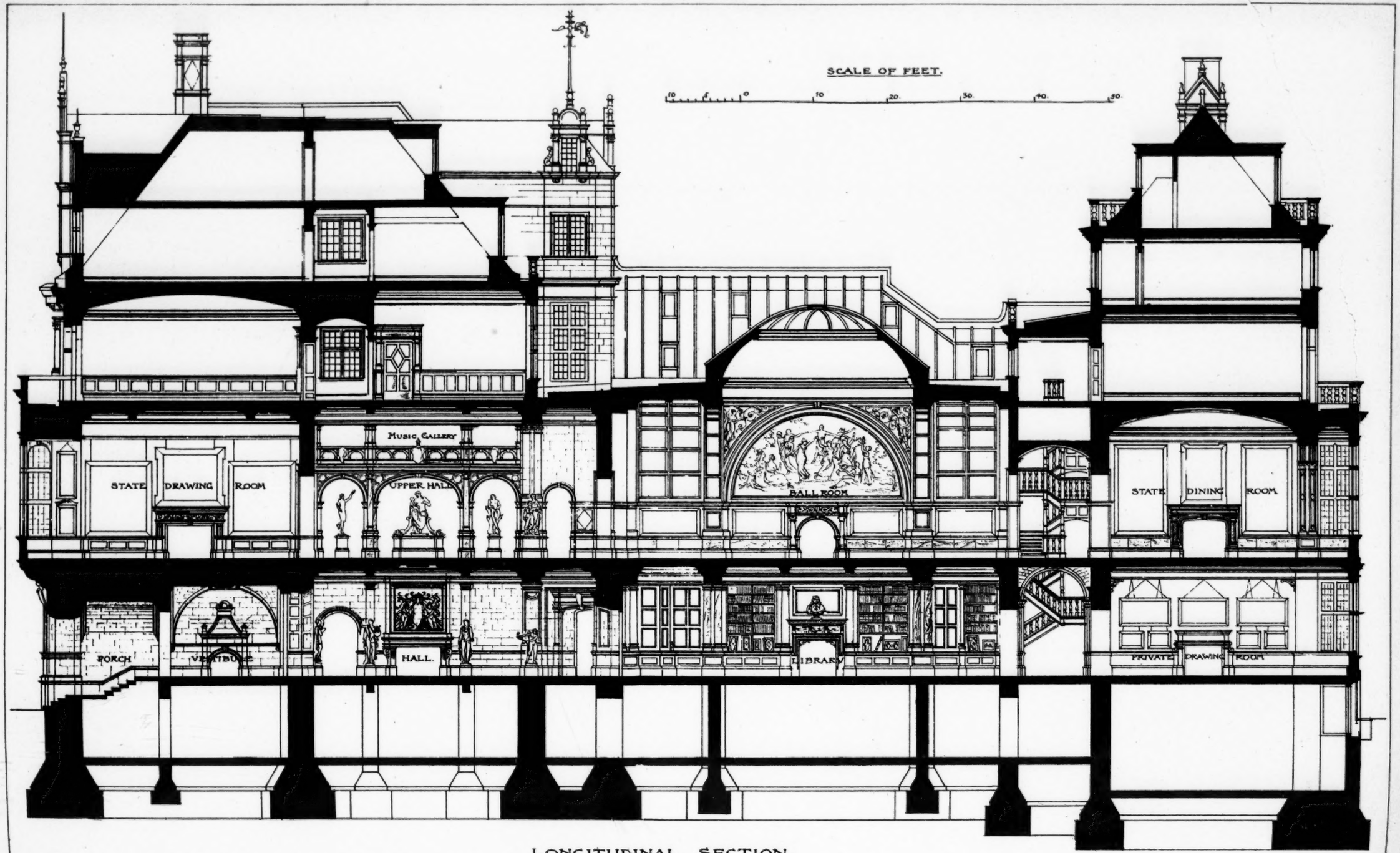

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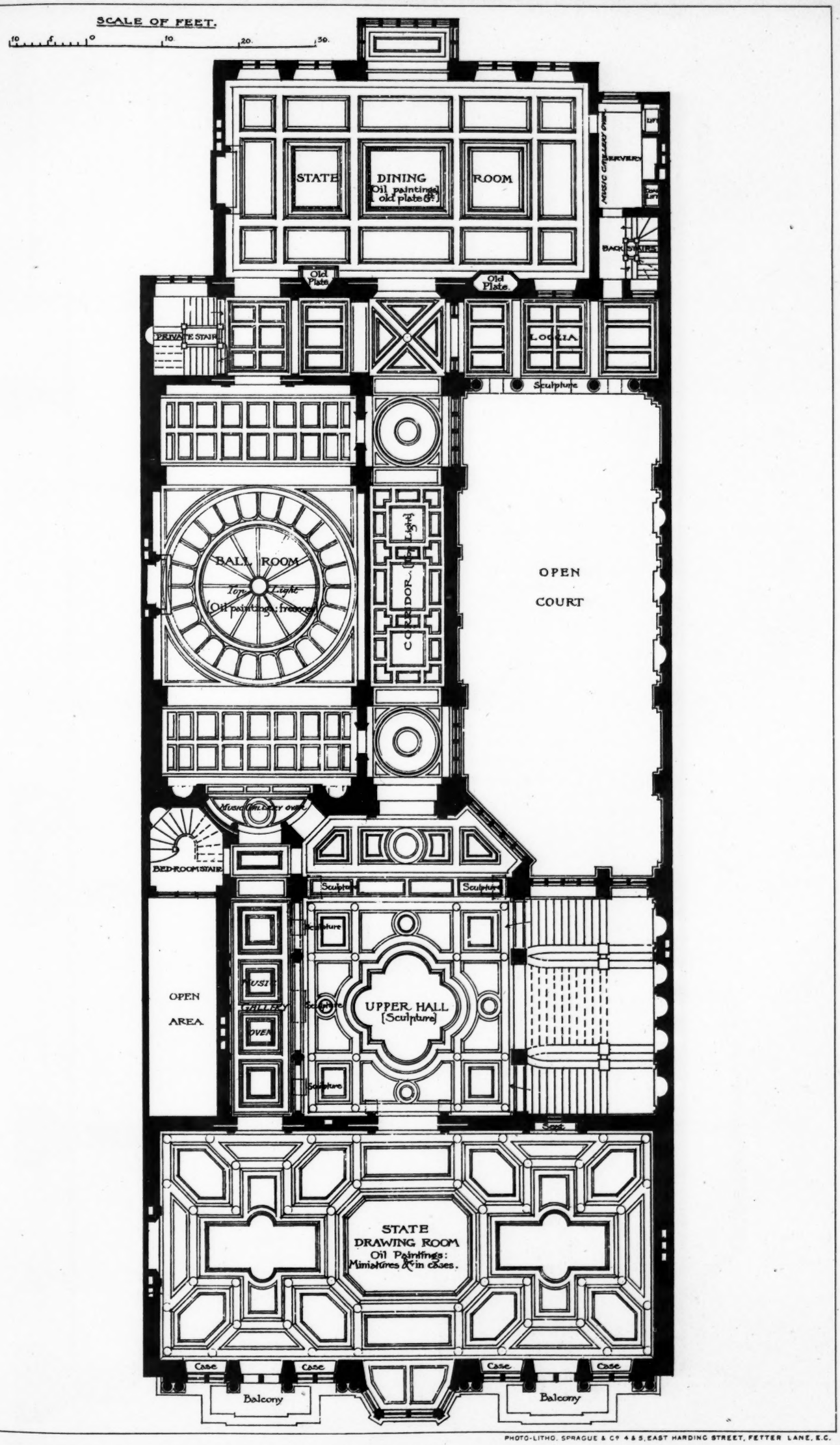

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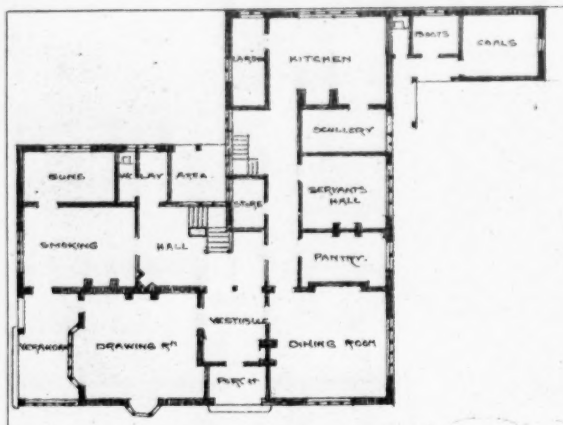

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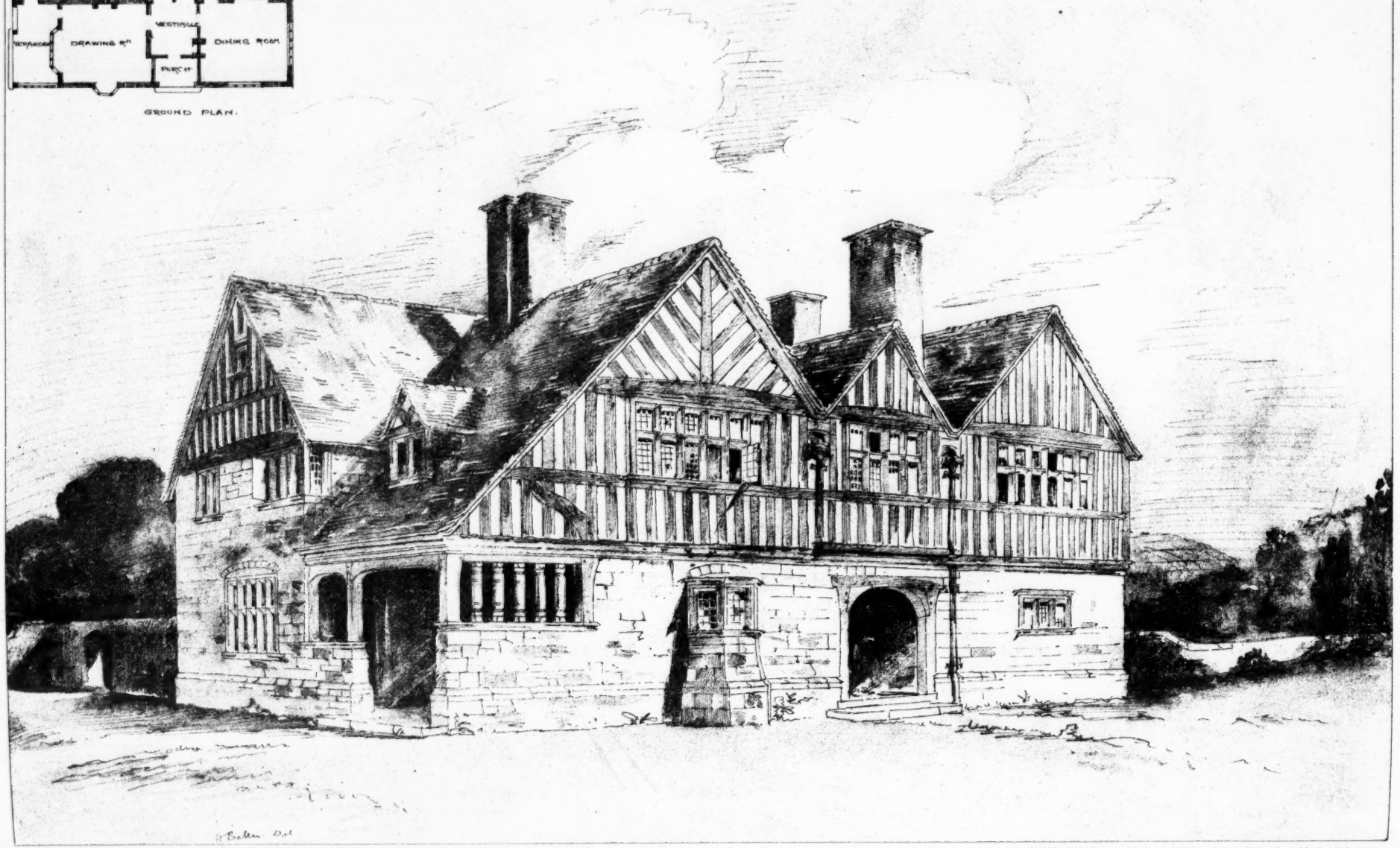

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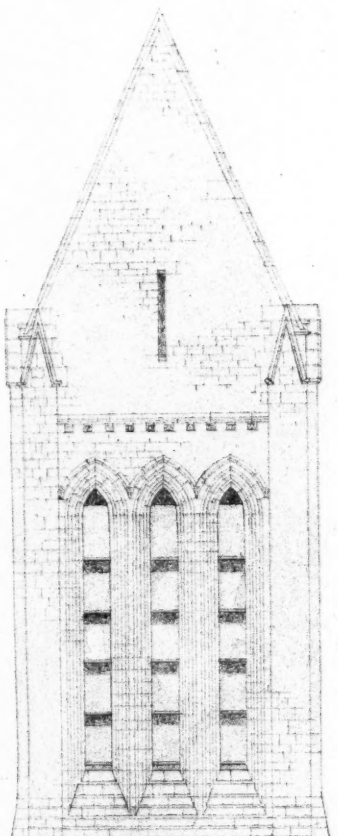

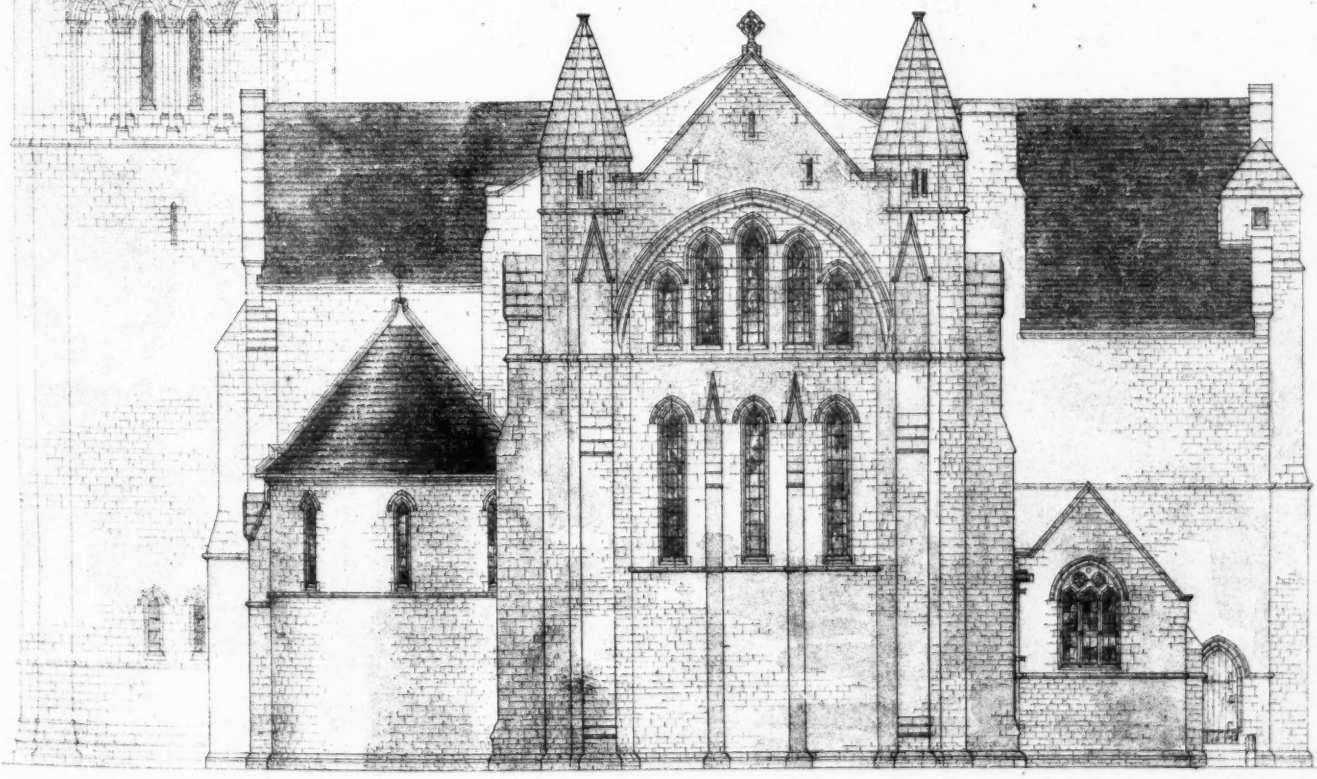

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by

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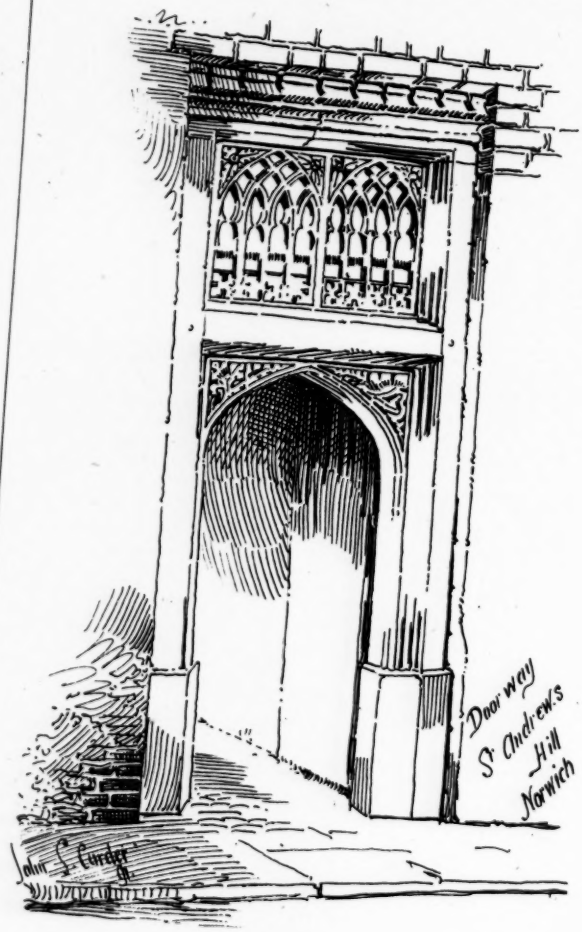
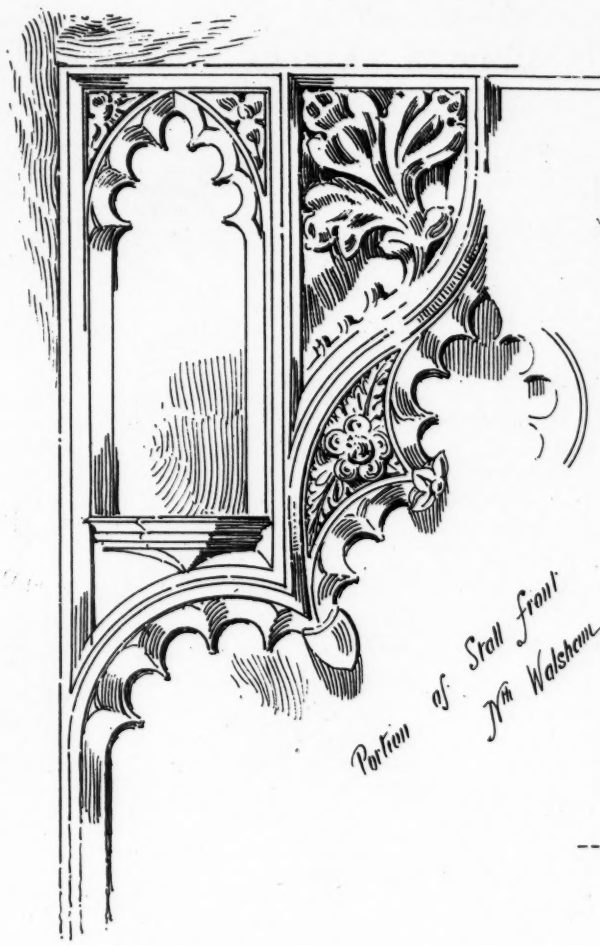


Poppy head.
Chancel Nth Walsham



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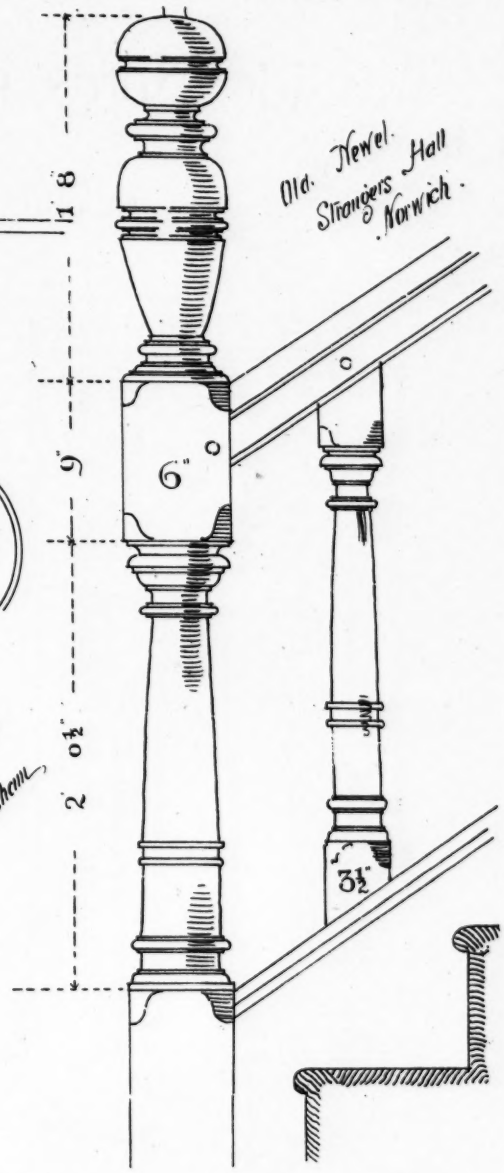

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May 91.

Cawston Church.

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